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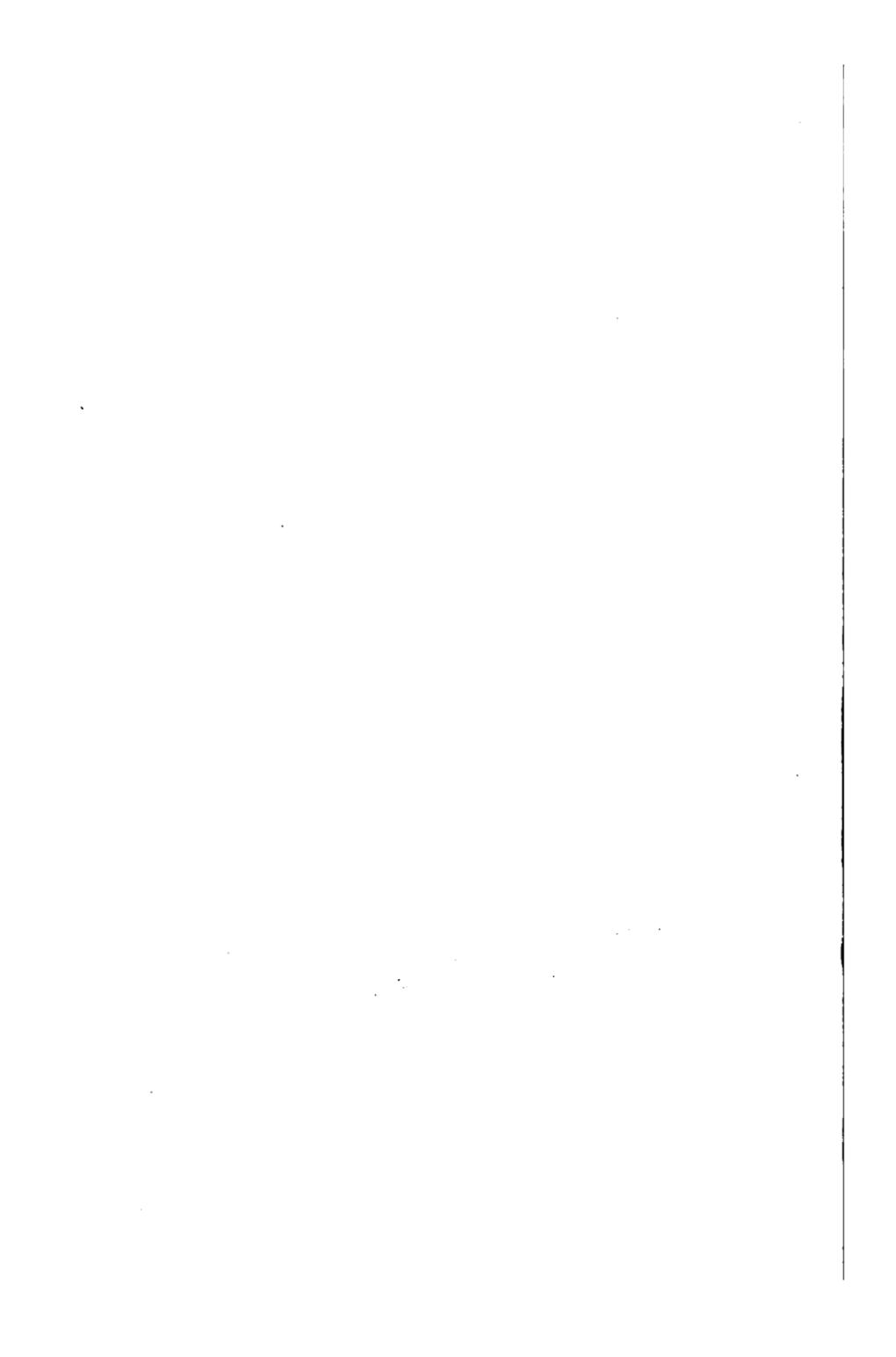
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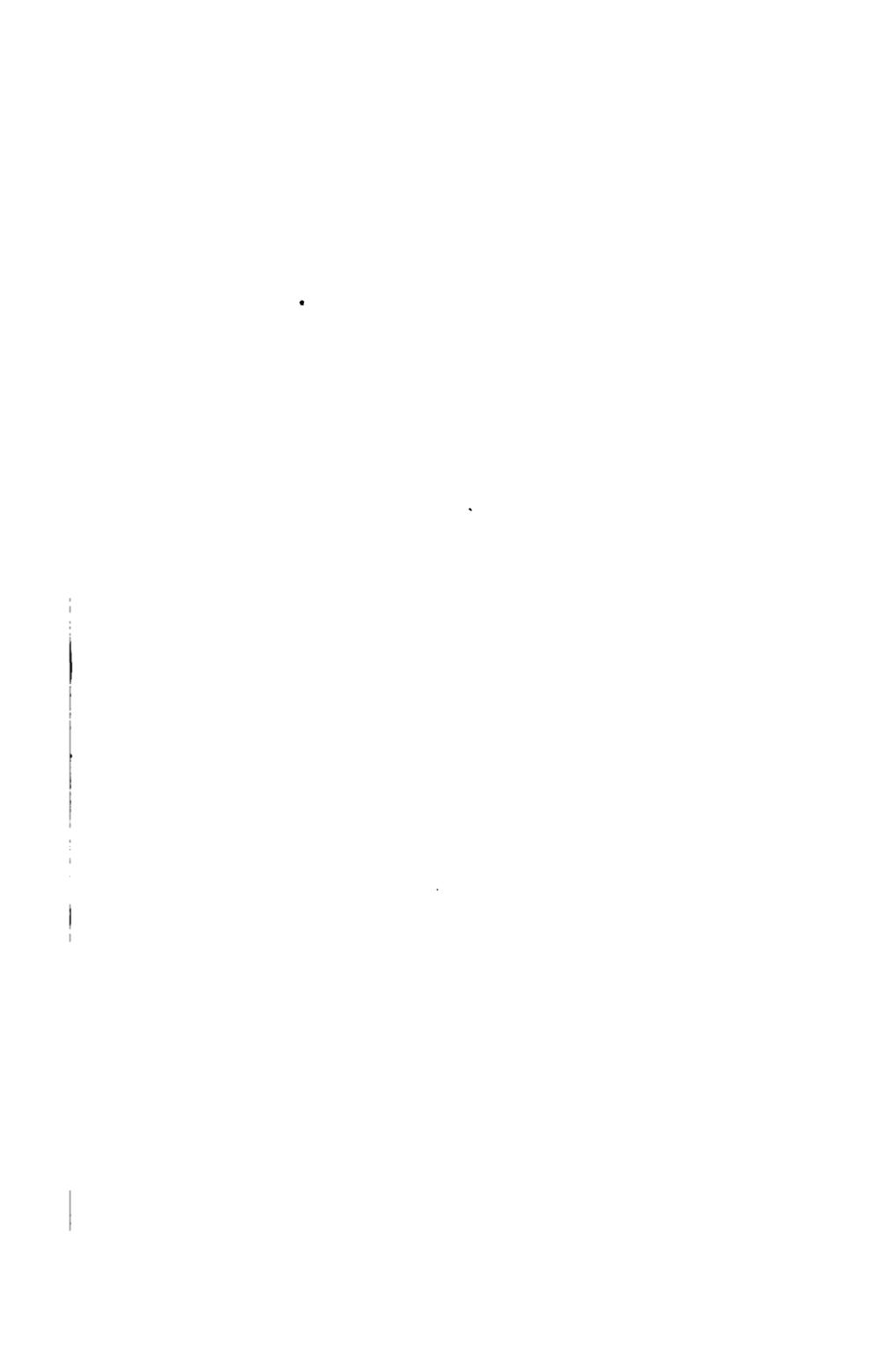


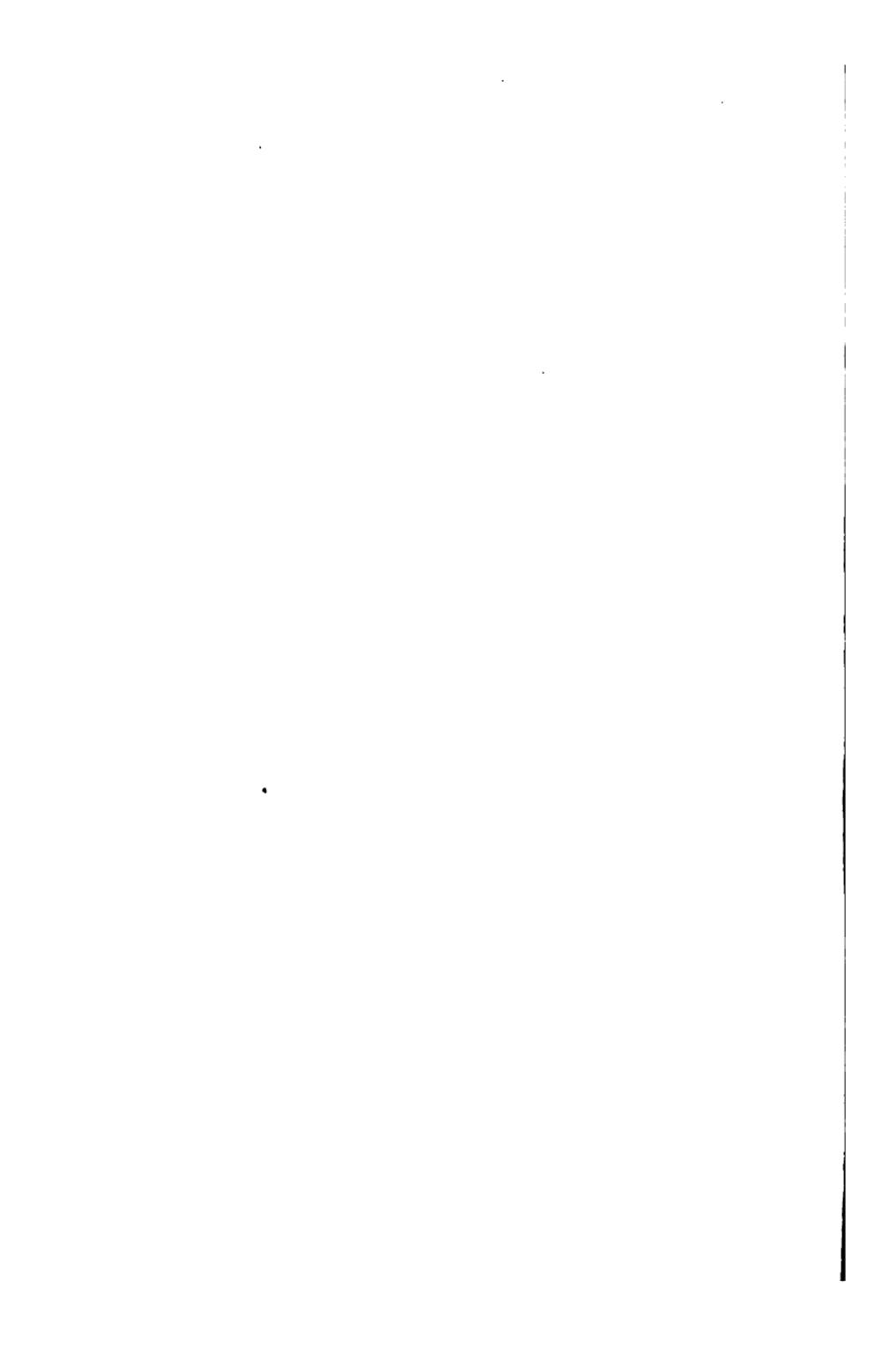
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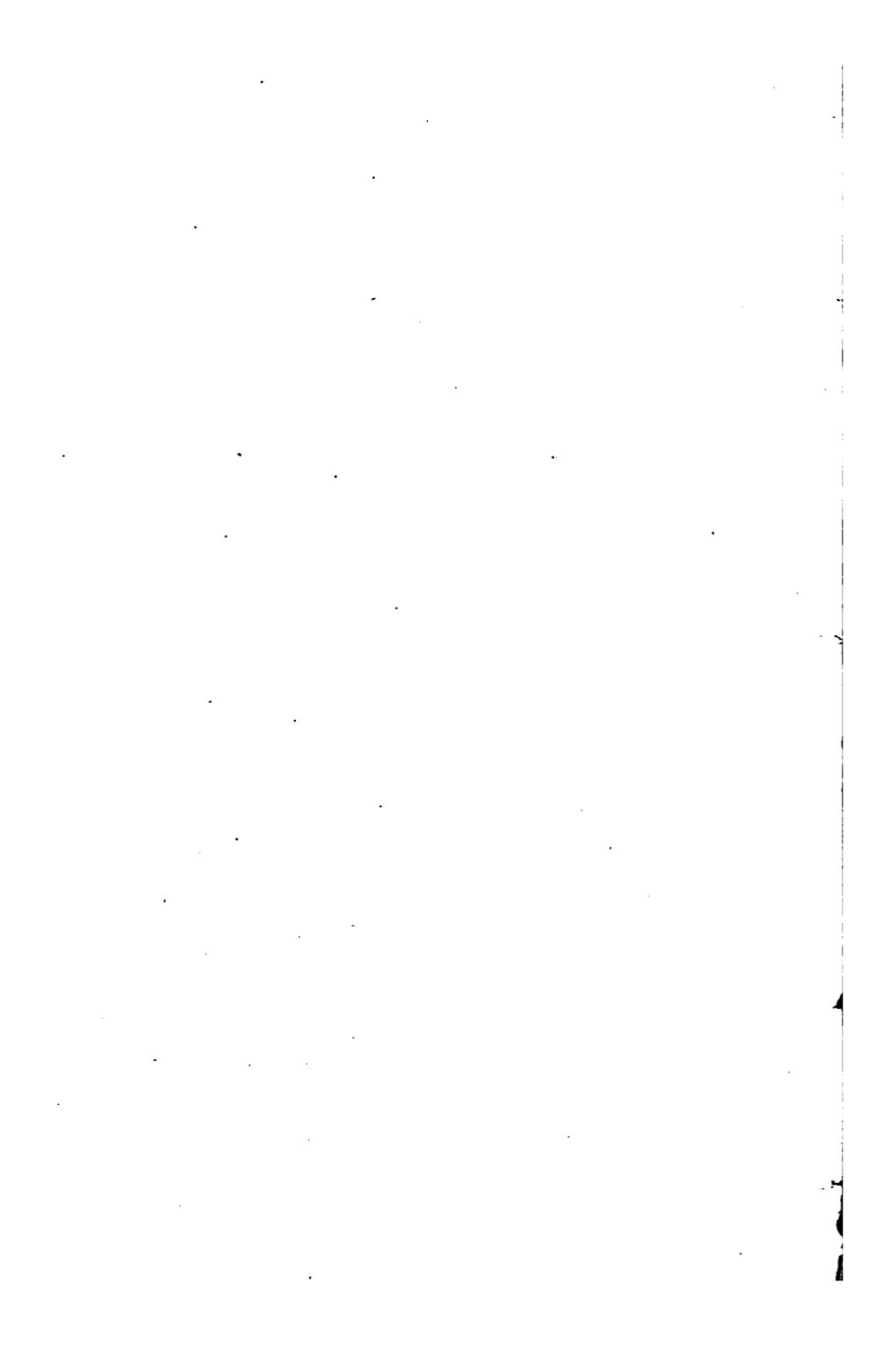
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BOSTON MONDAY LECTURES.

HEREDITY,

WITH PRELUDES ON CURRENT EVENTS.

By JOSEPH COOK.

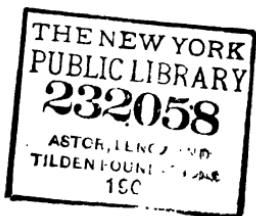
Flavious

Πάσι δ' ἀγγέλλω βροτοῖς,
'Εσθλῶν ἀπ' ἀνδρῶν εὐγενῆ σπείρειν τέκνα. — EURIPIDES.



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INTRODUCTION.

THE object of the Boston Monday Lectures is to present the results of the freshest German, English, and American scholarship on the more important and difficult topics concerning the relation of Religion and Science.

They were begun in the Meionaon in 1875; and the audiences, gathered at noon on Mondays, were of such size as to need to be transferred to Park-street Church in October, 1876, and thence to Tremont Temple, which was often more than full during the winter of 1876-77, and in that of 1877-78.

The audiences contained large numbers of ministers, teachers, and other educated men.

The thirty-five lectures given in 1876-77 were reported in the Boston Daily Advertiser, by Mr. J. E. Bacon, stenographer; and most of them were republished in full in New York and London. They are contained in the first, second, and third volumes of "Boston Monday Lectures," entitled "Biology," "Transcendentalism," and "Orthodoxy."

The lectures on Biology oppose the materialistic, and not the theistic, theory of evolution.

The lectures on Transcendentalism and Orthodoxy contain a discussion of the views of Theodore Parker.

The thirty lectures given in 1877-78 were reported by Mr. Bacon, for the Advertiser, and republished in full in New York and London. They are contained in the fourth, fifth, and sixth volumes of "Boston Monday Lectures," entitled "Conscience," "Heredity," and "Marriage."

In the present volume some of the salient points are:—

1. An historical study of ancient Greece as illustrating the capacity of the race to produce great men rapidly (Lecture I.).
2. A defence of Aristotle's definition of life as "the cause of form in organisms," and of the author's definition of life as "the

INTRODUCTION.

power which directs the movements of germinal matter" (Lectures II., III., IV., and VI.).

3. A discussion of the necessary inferences to be drawn from the facts that a structuring power must exist before tissues can be structured, and that life is the cause of organization, and organization not the cause of life (Lectures II., III., IV., and VI.).

4. A defence of the fundamental and necessary beliefs of the soul as originating from the nature of the structuring power existing previously to organization, and therefore as independent of experience (Lecture III.).

5. A consideration of the necessary beliefs of conscience as originating in the nature of this same structuring power, and as, therefore, independent of organization and experience (Lectures III. and V.).

6. A reply to several materialistic positions of Maudsley, Darwin, and Spencer, concerning the causes of the unlikeness of forms in organisms (Lectures II., IV., and VI.).

7. The theory of Lotze as to the union of soul and body and the twofold identity of parent and offspring (Lecture VII.).

8. The author's theory on the same points (Lecture VIII.).

9. The laws of direct, reversal, collateral, co-equal, pre-marital, pre-natal, and initial heredity (Lecture IX.).

10. A discussion of the perfectibility of the race through the application of the laws of hereditary descent (Lecture X.).

The committee having charge of the Boston Monday Lectures for the coming year consists of the following gentlemen:—

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PUBLISHERS' NOTE.

IN the careful reports of Mr. Cook's Lectures printed in the Boston Daily Advertiser, were included by the stenographer sundry expressions (applause, &c.) indicating the immediate and varying impressions with which the Lectures were received. Though these reports have been thoroughly revised by the author, the publishers have thought it advisable to retain these expressions. Mr. Cook's audiences included, in large numbers, representatives of the broadest scholarship, the profoundest philosophy, the acutest scientific research, and generally of the finest intellectual culture, of Boston and New England; and it has seemed admissible to allow the larger assembly to which these Lectures are now addressed to know how they were received by such audiences as those to which they were originally delivered.

I.

HEREDITARY DESCENT IN ANCIENT GREECE.

**THE NINETY-FIRST LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, DEC. 10.**

Ἐτι διοτι βελτίους εἰκος τοὺς ἐκ βελτιόνων.

ARISTOTLE: *Politics*, iii. 8.

Wohl dem, der seiner Väter gern gedenkt,
Der froh von ihren Thaten, ihrer Grösse
Den Hörer unterhält, und still sich freuend
Ans Ende dieser schönen Reihe sich
Geschlossen sieht! Denn es erzeugt nicht gleich
Ein Haus den Halbgott noch das Ungeheuer;
Erst eine Reihe Böser oder Guter
Bringt endlich das Entsetzen, bringt die Freude
Der Welt hervor.

GOETHE: *Iphigenia in Tauris*, l. 3.

HEREDITY.

I.

HEREDITARY DESCENT IN ANCIENT GREECE.

PRELUDE ON CURRENT EVENTS.

WHICH is the cheaper, to fight the American Indians, or to civilize them? Which is financially the wiser, savage butchery used against savages, treachery employed against treachery, Indian agents worse than the savages themselves to match these decimated tribes; or a policy of justice, a style of action now recommended by two administrations at least, although first inaugurated when William Penn, with a sound heart and wise head, sailed up the Delaware? [Applause.] Only a few drops of Quaker blood were ever shed by an Indian. The heathenish, electrically infernal creature which we call a savage does treat us much as we treat him. We have 60,000 Cherokees who are civilized and quiet, and they cost us almost nothing; but we have 10,000 wild

Apaches, and the government pays yearly to the army that takes care of them \$2,000,000. We spend now about \$5,000,000 a year in gifts to the Indians, or in the support of soldiers to keep them in order. Official statistics published lately show that the Indian war in Florida cost \$50,000,000; the Sioux war of 1852 and 1854, \$40,000,000; the Oregon Indian war of 1854 and 1855, \$10,000,000; the Cheyenne war of 1864 and 1865, \$35,000,000; the Indian war of 1860 with the Sioux, over \$10,000,000; the war of 1867 with the Cheyennes, \$40,000,000. Gen. Sherman says that the cost of caring for the Indians of New Mexico by the army, from 1846 to 1860, was \$100,000,000. Thus the fact stands out beyond all controversy, that, for the past forty years, the military operations of the nation against the Indians have cost on the average \$12,000,000 annually.

Do you say that, after all, the Indian is dying out? The President of the United States reminds us that the American savage is not on the verge of evanescence. The statistics that I have before me, from official sources, assert that in 1864 the number of schools among the Indians was only 89, and in 1873 it was 2,600. In 1864 the number of scholars among the Indians in the United States was 261; ten years later it was 9,000. In 1864 the number of acres farmed by the Indians was only 1,800; in 1873 it was 297,000. In 1864 the number of bushels of wheat raised by the Indians in the United States was 44,000; ten years later, 288,000. The value of their animals in 1864 was \$4,000,000; in 1873 it was \$8,900,000.

The truth is, that the closest observers understand very well that the poor Indian, who has been on the point of vanishing, has made up his mind not to vanish! If a just policy could prevail, if the advice given by the honored executive of this nation to the Indian chiefs a few months ago at the White House could be followed, we should find the figures astounding us ten years hence more than they do now, by indicating an increase of more than ninety per cent in the number of acres farmed by people who once were savages or half-breeds.

There is a popular misapprehension on the point of the decadence of the Indian race. It is true that they are unwilling to cultivate the land; it is certain that they are haughty at the hoe-handle: but when we walk among their wigwams, and contrast what we see there to-day with their condition ten years ago, a few marvellous facts must fix our attention.

Let us pace to and fro in this encampment far away on the Red Lake agency in Minnesota. The Indians at the agency number 1,100, and the reservation contains 3,000,000 acres of land. What have these Indians done in a year? I am reciting an official report; and I find that these 1,100 Indians, or, putting out the very young and the very aged, say about 1,000 persons that can handle an agricultural implement, have raised 7,000 bushels of corn, an excess of 1,000 bushels over any preceding year; 2,000 bushels of potatoes, and 430 bushels of other vegetables; have cut 250 tons of hay; made 5,000 pounds of maple-sugar—I wish I were there!—

gathered 600 bushels of berries; caught 750 pounds of fish, all of them probably as beautiful as any ever taken in the Adirondacks; and have captured \$14,000 worth of furs, and made 1,000 yards of matting. One thousand people, 7,000 bushels of corn; that is seven bushels apiece: \$14,000 worth of furs; fourteen dollars the result of the trapping of each man. It is evident that they have done better at trapping than at most other things; but have you farmers on these desolate stretches and pine barrens between Cape Cod and Mount Wachusett done better with your agricultural products? Have many in the fatness of the Mohawk Valley, or the Mississippi, done better? No doubt this is a favorable specimen of the action of the Indians on a reservation.

But we transfer this audience to the Lake Superior agency in Wisconsin. We find the Indians extremely anxious to have their reservation improved. They express themselves as willing to do without clothing and blankets, if they can have a schoolhouse and teacher. One of them has built a house himself, and furnished it as white men's houses are furnished. He has a bedstead, cups and saucers, plates, knives, forks, and spoons, and a No. 8 cook-stove. What does this indicate?

“He brushes his hat o' mornings:
What should that bode?”

Much Ado about Nothing, act iii. sc. 2.

Should not an abundance of encouragement be given to such enthusiasm? There is undoubtedly a change

when we compare the present time with ten years ago. Here is an officer whose language we shall do well to weigh verbatim: "Two things were noticeable: first, the cleanly appearance of all the Indians. I saw no sights from which to turn with disgust, as upon former visits; and I could not but remark this change. Three years ago, when I first visited these bands, I found them dirty, ragged and filthy, lazy and ignorant, in a degree beyond any thing I had ever imagined. Their blankets, clothing, and hair were perfectly alive with vermin; and they had the woodlands covered with birch-bark wigwams. To-day I found them generally dressed in civilized costume, their hair combed, and their faces and clean white shirts showing that some one has taught them the use of soap and water." First chapter of the gospel! "The absence of the birch-bark wigwam assures me that many have taken advantage of the teachings of Mr. and Mrs. Holt, and built houses in which to live and entertain their friends." But Mr. and Mrs. Holt wished to institute a manual-labor boarding-school, and what was their only trouble? There was nothing in their pockets, because you put nothing there. They desired to establish a district school on that agency. The little building they possessed, they had to close early in June, because of the lack of funds. But all through the Indian reservations we find the desire for little churches and little schools, especially manual-labor boarding-schools, increasing.

A significant Indian scene lately occurred at Wash-

ington. "Build us a big cabin for our children, and teach our young people as you do your own," said a large group of not wholly barbaric chiefs to President Hayes at the White House. "Give us wagons with four wheels. Send us priests," was their phrase; "and we, little by little, will learn to use the land, now that our hunting-grounds are gone." In order to impress their sincerity upon the Executive and this nation, they went away, and meditated two days upon the answer they should make to the advice of the president, and finally threw off their savage robes,—the costume which indicates, with the Indian, the victories he has obtained, a kind of heraldry, of which, of course, he is as proud as ever noblemen were of theirs in the Old World,—and then these poor children of the wilderness returned to the White House in civilized costume, and before the gaze of the nation made speeches through the mouths of their shrewdest men, clamorous for wagons, school-houses, and churches. [Applause.]

We find the better class of the savages desiring these institutions; and the report that comes back in case after case is simply, "Schools shut: no funds." In hurried America, luxurious and plenteous in its products of all sorts, there is not penuriousness, but there is carelessness. It is difficult to attract public attention to these themes. If a little opportunity here, in presence of scholars, is given to put the trumpet to the lips, you must pardon me for employing it. There is not only great need, but very great necessity indeed, of following up our governmental

aid by private effort. There has been a pride in the Anglo-Saxon race, ever since parliament was founded, in doing things without the support of the king. We do not, like the Communists, depend on the government to pay our taxes and protect us at the same time. The government never fleeced us, and we do not ask the government to do every thing. We have depended altogether too much on Congress to take care of these savage tribes. Undoubtedly two administrations have done well; but we must supplement governmental activity by aiding the best agencies of the religious denominations.

Whatever carries the schoolhouse; the agricultural implements, the church, the teacher, to the Indian reservations, ought to have behind it a breath of public sentiment, vigorous as any north or south wind that ever pinched us in winter or blessed us in summer. We must carry to the red men the hearts of Boston and of New York, and piece out the hearts of some Indian agents who are not saints. [Applause.] It has been suspected that Professor Marsh of Yale College told the truth lately concerning Red Cloud. I beg your pardon; I did not intend to discuss politics here; but it is a suspicion of some in Boston, that poor beef was sold to the Indians, and that Red Cloud had really a murky cloud of just complaint behind him. Secretary Schurz has recently affirmed (Dec. 2), in an official document, that, in his opinion, the present machinery of the Indian service is not sufficient for the prevention or discovery of abuses and fraudulent practices. The

attempt to bring thievish Indian agents to justice, he says, "is very like catching birds with a brass band." Poorly paid and miserably dishonest officials have fleeced the Indians, and counteracted the effect of our schools. The agent is there, the missionary is there, your teacher is there; and, if there cannot be funds enough put into the hands of those who are teaching and preaching, we may be sure that the agents who wish to fleece the Indians will in some way obtain funds enough—not, of course, from the Indians, but by taking the supplies that come to them through the general government. For one, I greatly admire the Indian policy of our honored Executive as expressed in his address to the Indian chiefs a few days ago. If you do not, I shall make no apology for being political so far to-day as to say that better sense has not often been uttered to the savages than President Hayes urged upon those chiefs a few days ago in the East Room of the Capitol at Washington. [Applause.] But that *sense* needs *cents* behind it. [Applause.]

THE LECTURE.

It were a felicity, if, in opening the topic of Hereditary Descent, this audience could assemble on the Acropolis, and with the eyes of history and science gaze abroad from the Parthenon upon the transfigured landscape of ancient Attica. Let us suppose ourselves standing in the Parthenon, behind the pillars in whose shadows once fell the footsteps of Pericles, Euripides, Plato, Aristotle, and Demos-

thenes. Yonder on the slope of the brown pasture is the semicircular enclosure called the Pnyx, where the audiences of Demosthenes and Pericles were accustomed to assemble in the open air to listen to the yet unequalled orations, which, next to the dialogues of Plato and the loftiest Greek dramas, were the best product of Athens in her supreme hour. Among the groves of the Cephissus within sight are the gardens up and down which Plato walked many a year, and in which all of us, according to our culture, have in thought more or less often paced to and fro. There was the Academy. This is a modern word. On the other little Athenian stream, the Ilissus, stood Aristotle's Lyceum. That term is singularly familiar in the latest civilization. At one corner of the Acropolis we have a slope running down toward the south-east sun; and in it is scooped a semicircle, partly in the earth, partly in the rock, uncovered in 1862 by Hofbaurath Strack's German shovels. Here is the spot where the auditors of Æschylus and Sophocles sat when they listened to the sublime dramas which were the true pulpit of ancient Greece. Some of the chairs there have on them carving so perfect that you find a lion's claw still savagely sharp, although sculptured when the Scots and Picts yet harassed the barbaric British isle. We look next on the spot where Socrates is said to have drunk the poison, and to have gazed toward the sunset when he told his weeping disciples that they might bury him after his death if they could catch him. Here is a scarped ridge of reddish-

gray rock, historically loftier, perhaps, than any other Athenian summit, and certainly more easily visible through the dun smokes of distance than any of its companion heights. We call it Mars Hill; and on it was made a speech which eighteen centuries have heard, and to which eighteen more will listen. This audacious address in the presence of a city filled with temples of gods in marble, and underneath the shadow of Minerva and the Acropolis, face to the face with the immemorial customs of polytheism, asserted the existence of one personal God, omnipotent, omnipresent, and in conscience tangible. Toward the west the white sacred road to Eleusis passes over the low, thinly-wooded heights of Daphne. Parnes yonder juts sternly into the northern sky, with a few streaks of vapor clinging to his gnarled and barren sides. In the east is Hymettus, and in the north-east Pentelicus; beyond it Marathon; and in the opposite direction gleam the straits of Salamis.

What has all this to do with hereditary descent?

1. This ancient Attica opened her arms to emigrants from Phœnicia, Egypt, Asia Minor, and all the teeming shores of the Mediterranean.

2. The social life of Athens in the classical age was such that only very able men could take any pleasure in it; and no other city on the globe offered equal attractions to such men.

3. Able emigrants were attracted to a city giving exceptional privileges to the able, and only to the able.

4. Thus arose a system of partly unconscious selection. (See GALTON, *Hereditary Genius*.)

The structure of the Athenian law courts obliged every accused citizen to defend himself by a speech before a jury, and thus made oratory indispensable to success in any prominent career. An Athenian jury often contained five hundred men. Every free citizen needed as much to know how to make a speech as how to bear arms. George Grote says that the Athenian law which required every accused citizen to defend himself before juries made it as necessary for rhetoric to be taught to the free man as for strategy in war to be learned by the military portion of the population. You remember that Socrates defended himself before the jury-court which tried him. It was a political and social necessity for Athens to have teachers of rhetoric, logic, and politics. Great schools sprang up in rhetoric; and the free men, who were obliged to know how to speak in public for themselves, made good audiences for the orators and poets and philosophers. Little by little, as there were good hearers, there came to be good speakers. "It is the audience that makes the orator," Demosthenes used to say. The free men had little on their hands but their civil duties. They were aristocrats. There was a great population of slaves; and of course we abhor Athenian customs in this particular. But unless a man had ability, as well as a certain amount of wealth, it was difficult for him to hold a position in ancient Athens. He dropped easily into the artisan class. Emigrants were called in, but they were sifted as fast as they came. All of the average, and the lower than aver-

age rank in ability, were likely to drift into the artisan class. The upper order contained a great mass of exceedingly able individuals. Perhaps there never has been such a development of genius as occurred after this unconscious natural selection began in the unrolling of Athenian history.

5. In two centuries, or from 500 to 300 B.C., the Greek race produced the following illustrious persons, twenty-eight in number:—

These were statesmen and commanders—Miltiades, Leonidas, Themistocles,—mother an alien,—Aristides, Cimon, Epaminondas, Phocion, Pericles.

These were philosophers and men of science—Pythagoras, Socrates, Hippocrates, Euclid, Plato, Aristotle.

These were poets—Anacreon, *Æschylus*, Pindar, Euripides, Sophocles, Aristophanes.

These were architects, sculptors, and artists—Apelles, Phidias, and Praxiteles.

These were historians—Herodotus, Thucydides, Xenophon.

These were orators—*Æschines* and Demosthenes.

6. Almost without exception these twenty-eight men were either born, nurtured, or educated, in Attica; and they all, without exception, owed inspiration to her.

7. But take Attica alone, and we find that in a single century she produced fourteen of these twenty-eight illustrious men.

8. Attica contained, in the best days of Greece, a population of only about ninety thousand free per-

sons. She had forty thousand resident aliens, and a laboring and artisan population of four hundred thousand slaves.

Little Attica physically resembles Eastern Massachusetts. It is a desolate stretch of pine barrens. The agricultural class never could have been numerous there. Wherever you irrigate the soil, however, it has almost a tropical fatness; and undoubtedly the rich banks of the Cephissus, which to-day remind you of the shores of the Nile, were originally much more widely spread into the brown dun of the general landscape around Athens than they are to-day. Wherever there is no irrigation, a vigorous sunlight comes down, and burns up, not the grasses merely, but the orchards and almost the pines. The stalwart evergreen, which in Norway grows half as high as the magnificent monument yonder on Bunker Hill, is stunted in Attica until in most cases it is a shrub. Only in the gorges, where its roots are watered by springs, does it attain a natural size. This barren little territory had in it, in the century from 530 to 430 B.C., ninety thousand free persons, not enough to make a city of respectable size. These were native and free born, or had obtained full rights, if emigrants. Scholars are very well agreed as to these statistics. Elaborate investigation has been applied to the topic, and we do not need at present to go carefully into the proof that this was the population of ancient Attica.

9. The population of any country renews itself about three times a century.

10. Suppose, therefore, that we have in the great century of Athenian history two hundred and seventy thousand free-born persons, — that is, three times the ninety thousand. Of these there would be one hundred and thirty-five thousand and ninety males. Of these one-half, or sixty-seven thousand five hundred, would survive the age of twenty-six, and one-third the age of fifty.

11. There was, therefore, in free Attica, in her best century, one illustrious man to every four thousand eight hundred and twenty-two above the age of twenty-six, or say *one to every five thousand of mature men.*

There is the fact. This is what the human race can do. That one to every five thousand of mature Greek men in Attica was illustrious, is an absolutely indisputable circumstance, on which, standing here with the audience upon the Acropolis, I desire you to fasten your attention as a headlight in the perhaps tortuous labyrinth of our discussion as to the natural laws of descent. Galton in his work on Hereditary Genius (American edition, p. 341) makes several mistakes in dates, but, from a narrower induction, arrives at this same result, — that one in five thousand of mature men of the great age of Athens was in such a sense distinguished that to this hour we are proud to make these men our teachers in philosophy, oratory, poetry, and art. The suggestive course of thought pursued by Galton is freely used in this discussion, and is credited to him; but so many changes in the way of enlargement and cor-

rection have here been made in his propositions, that he is not represented by this lecture.

Compare this average with that of any nation of Europe since the classic age of Athens. Where is the man in modern Europe that we shall put beside Socrates? Where are the men in England who are fit to stand side by side with Aristotle and Plato? Where is the name in art that can match that of Phidias? I am not underrating modern times, but I beg you to consider the stretch of duration since Greece fell. We have had twenty centuries, and Greece had less time than has elapsed since our fathers' feet pressed Plymouth Rock. The narrow territory of Attica produced fourteen illustrious men in less time than has now gone by since the battle of Bunker Hill. Greece gave birth in two centuries to the marvels of human attainment and endowment represented by these twenty-eight names.

12. In two thousand years all Europe has not brought forth an equal number of men as illustrious as twenty-eight Greeks were who appeared within two hundred years. In twenty centuries the whole world has hardly produced as many important additions to the roll of honor among leaders of thought and action as Greece made in six generations.

13. Estimated according to the rules of science, the average ability of the Greek race was greatly higher than that of the modern English and American. Galton and other British writers assert that it was as much higher than that of the loftiest race on

the globe to-day, as the ability of that proudest race is higher than that of the African.

Perhaps if we place Bacon by the side of Plato, and Michael Angelo by the side of Phidias, our estimates will produce no great debate. But when we have mentioned Shakspeare and Milton, when we have taken into view five or six statesmen, we very soon find that we are running outside the range of two hundred years. Take the two thousand years since Greece fell, sum up all the brilliant stars in the historic firmament of those twenty centuries, and there is no more light in all that wide heaven than in the single Greek constellation of Orion, or in the compact Athenian Pleiades, which blaze close about us as we stand here on the Acropolis. [Applause.]

It will be remembered that the average free-born citizens of Athens could listen to the orations of Demosthenes, and immediately vote at the close of them. We have these orations written out by himself; and Rufus Choate used to say that there is not an audience in the United States, except the judges and lawyers of the Supreme Court, that could bear such condensation of matter. Some one has remarked that you cannot strike a word out of Milton with a trip-hammer. It may be said of the orations of Demosthenes, that the most powerful impact of iron and brass will not strike out a single stone from the rhetorical monument he has raised to himself, and not to himself only, but to the audiences who could follow him with delight. Athenian citizens had been so trained in public debate, and had so educated

themselves to defend their own causes before the law courts, that they were not only pleased, but demanded, to be addressed in the style exemplified in these marvellous oratorical compositions. Contrast that ability of the average Athenian free population with that of our leisured and propertied class! Look into the libraries of our wealthier citizens! Go into the mansions and club-rooms and lyceum-halls of people who, in Athens, would have been free-born! Have we an Athenian intellectual taste? Are we as keen, even in the modern Athens, as men were on these slopes around the Acropolis on which we stand?

Remember that in the ancient days there were no newspapers. Demosthenes' orations were often not only editorials, but telegraphic despatches. When Cicero appeared before the people in the Roman forum, and said of the conspirator Catiline, "*Abiit, excesit, evasit, erupit*" ("He has gone, he has escaped, he has broken forth"), that was news. Now, what if there had appeared that morning an editorial in the Roman Times, Tribune, or Advertiser, giving the same incident? Cicero, no doubt, would have been shorn of many of his thunderbolts. The newspaper was not a rival of the platform in classic days, nor was the book to such an extent as it is now. Therefore the orator was inspirited as he is not in modern times. There never will come a day, perhaps, when oratory will have again such power as it had in Athens, and once at Rome. Look into the average book-stalls, and especially into our railway collections of rubbish, and into popular, or Congressional, or

any other assemblies as large and frequent as those addressed by Demosthenes from the Athenian Bema. We find ourselves, although free men, not quite Athenian, even in New England.

14. Athenian greatness declined for several reasons:—

 Morality grew lax.

 Marriage was unfashionable and avoided.

 Many of the most ambitious and accomplished women were evil, and so childless.

 Luxury brought in physical vices.

 The mothers of the incoming population were of a heterogenous class. (GALTON, *Hereditary Genius*, p. 343.)

Is it possible that any one has suspected that I have led you up the Acropolis in order to seek there for some volcanic rift breathing forth the more than Tartarean blackness of the sulphur smoke of free love, or of the leprous dreams of a philosophy which thinks that sound ideas concerning hereditary descent are its exclusive property? Have you supposed that I have come to this temple of the gods to forget Athenian history? Do you think that we have climbed up the heights of this glorious age of Greece to find that the cause of the strange sublimities that salute us here is disloyalty to natural law? Over the Acropolis and over Boston, over Plymouth Rock and over Mars Hill, over the Academy of Plato and the Lyceum of Aristotle, and over every poet's walk, every philosopher's study, every preacher's kneeling figure in modern days, bend the same meridians of

natural law! [Applause.] We shall find history in the ancient day faithful to the latest voice of science as uttered even by Spencer in the modern day; that is, to monogamy.

No doubt political oppression hastened the deterioration of the Greek race; for, after Athens became a Roman town, she did not attract great men. Of course she continued to be a teacher. She taught her own conqueror; and we have abundant evidence that the power of her glorious race continued for a while. But there was lacking in it the purity which belonged to the great era. The noblest age of Rome came out of monogamy. The old Etrurians believed in the family. The stalwart men who founded the city of the Seven Hills obtained their stalwartness, as every man has since, by obedience to natural law. We find that when Athenian greatness declined, marriage was being given up, absolutely indescribable vices were permeating the luxurious society of the wealthier age of Athens, and with looseness of life came in the various forms of intellectual effeminacy. Rottenness is the mother of littleness. The pygmy is always born of disloyalty to natural law. [Applause.] Athenian society became such that men who were not possessed of high endowments could succeed in it; and thus the natural selection ceased, and the brilliancy of Greece in history declined.

15. Although we have but two centuries of Greek experience, that little arc exhibits the possible results of obedience to the natural laws of hereditary descent, and shows of what the human race is capable.

16. If we could raise the average standard of civilization one grade, in both its moral and its intellectual departments, extraordinary changes would occur. The cause of events is to be found very largely in the thought of a few illustrious men.

17. Natural law is now what it always has been.

18. Standing here on the Acropolis, we have the right, therefore, to proclaim on the authority of history and science, that once, by purity and power at their best, the number of illustrious men born has been one in five thousand, and that it can be this again through the operation of the same unvarying causes.

Do you doubt this? and are you more or less sceptical concerning the operation of the law of hereditary descent in modern and even in ancient days?

Who was Aristotle? He was the founder of the Peripatetic school. He has been the teacher of twenty-two centuries. Who was his father? Nicomachus, a friend and physician to Amyntas II., king of Macedonia. He was the author of works on medicine and science. We have lost his manuscripts; but the father of Aristotle was a man of extraordinary ability and remarkable culture. Who was Aristotle's grandson? Nicomachus again,—the name recurs,—and, according to Cicero, this grandson was the author of the book we call the Nicomachian ethics,—a work generally attributed to Aristotle. Who was Aristotle's cousin? Callisthenes, the philosopher who accompanied Alexander the Great to the East. The mother of that Callisthenes was Hero, a near relative of Aristotle.

Who was *Æschylus*? He was the leader of all Greek poets, and perhaps superior to Sophocles, and even to Euripides. He was not only king of poets, but renowned as a warrior. Who was his brother? Cynægeirus, who fought side by side with *Æschylus* at Marathon. On this Acropolis there was once a painting commemorating these two brothers for their action on that battle-field. Who was his second brother? Ameinas, who commenced the attack on the Persian ships at Salamis. Who was his nephew? Philocles, who was victorious in a poetic combat with Sophocles. Who were other nephews? Euphorion and Bion, who were four times victorious in poetic contests, and founded a tragic school which lasted one hundred and twenty-five years.

Who was Cromwell? The first American. Who was his first cousin? Hampden the patriot,—the second American. You do well to remember these names with gratitude; for Macaulay says that Hampden and Cromwell were once on shipboard in England with the intention of coming to America for life. Cromwell, Hampden, and Milton were the first Americans. The first cousin of Cromwell was Hampden the patriot; another cousin once removed was Edmund Waller the poet. The son Henry behaved with gallantry in the army.

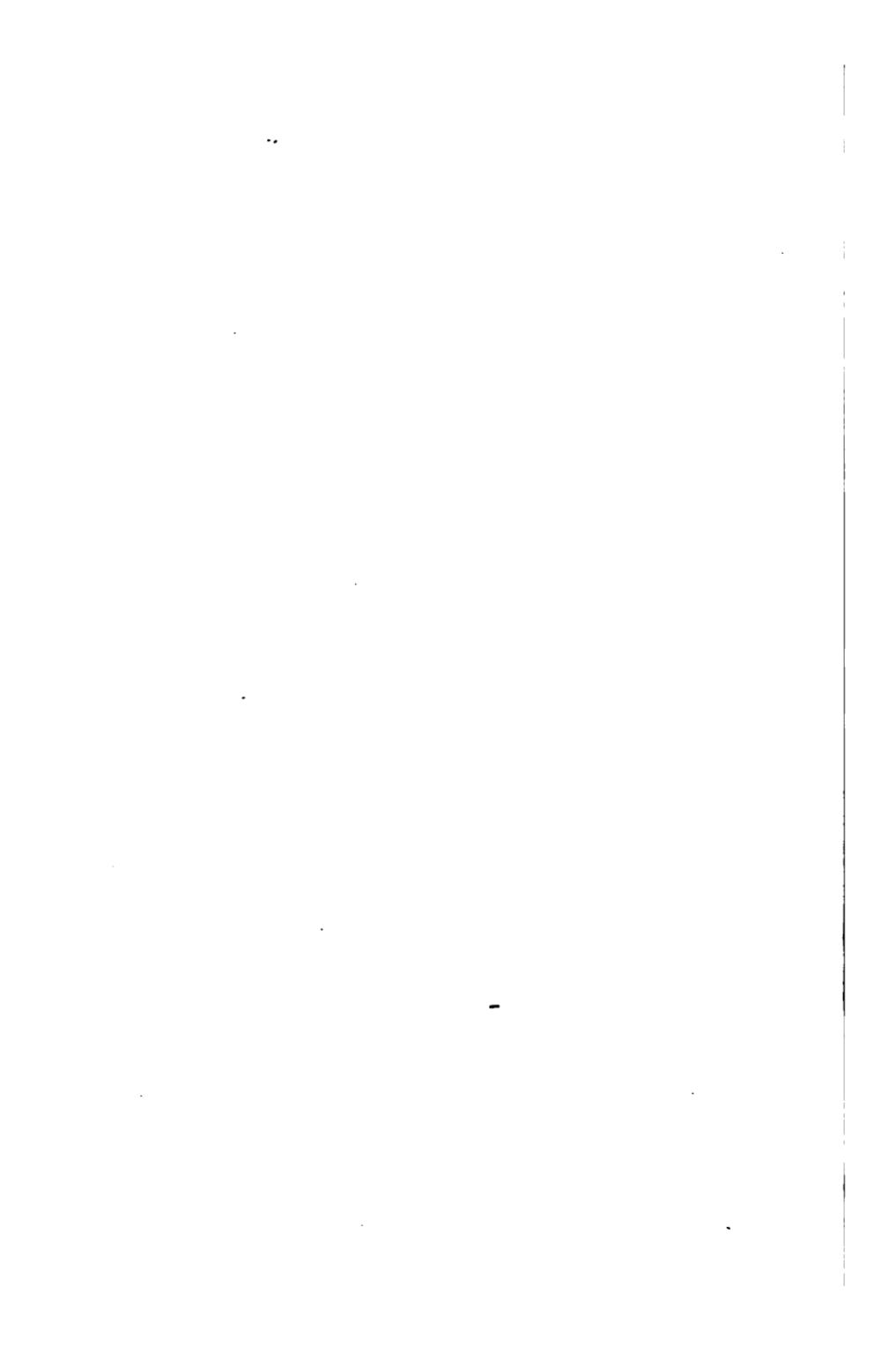
Who was William Pitt? A man who gave England dignity in the four quarters of the globe. Who was his son? The man who throttled Napoleon between 1783 and 1801, and 1804 and 1806, as premier of a power whose drum-beat was heard in all

the zones. Among his relatives were Lady Hester Stanhope, George Grenville, and Lord Grenville, who himself was premier.

Who was Lord Macaulay? His grandfather was a Scottish minister of Inverary, who was mentioned by Johnson in his account of his trip to the Hebrides. His father was Zachary, an abolitionist, who began a war which had its completion in the American civil contest. [Applause.] Zachary Macaulay was, in many respects, a greater man than his son. Balanced, deeply philosophical, a massive soul, he went to the coast of Africa, he bore persecution there, and he bore it for a while with Wilberforce in England, in order to carry past its breaking that earliest slowly-rising wave of anti-slavery, of which we now hear the retreating murmurs, half a million corpses borne floating within its green breast. Who was his uncle? Colin Macaulay, a general, a right-hand man of the Duke of Wellington in his Indian campaigns. Who was another uncle? Aulay Macaulay, a distinguished controversialist. Who was his first cousin? John Heyrick, head master of Repton, a renowned scholar. Who was his nephew? George Trevelyan, a member of parliament and junior lord of the treasury, and author of "Cawnpore."

Assembled here upon the Acropolis, look about upon all the summits of intellectual, moral, and social development, and you will find a sun rising behind them,—a truth to which the ages have as yet hardly listened,—that blood means God. Behind many clouds there brightens slowly in the rear of

these summits in Attica, in Germany, in France, in England, a meek, soft, overawing dawn splendor, prophetic of new eras. We think we stand already upon the heights of illumination concerning natural law. There is a day beneath the horizon, and only its faintest upstretching auroras are yet visible in the present human knowledge and observance of the laws of hereditary descent. [Applause.]



II.

MAUDSLEY ON HEREDITARY DESCENT.

**THE NINETY-SECOND LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, DEC. 17.**

Quel monstre est-ce, que cette goutte de semence, de quoy nous sommes produits, porte en soy les impressions, non de la forme corporelle seulement, mais des pensements de nos pères.—
MONTAIGNE.

From the hand of Him that loves her ere she sees the day,
the soul comes like a babe. Springing from her blessed Maker,
she quickly turns to that which yields her joy.—DANTE: *Purgatorio*, xvi. 84.

II.

MAUDSLEY ON HEREDITARY DESCENT.

PRELUDE ON CURRENT EVENTS.

THERE is an Eternal Power that makes for righteousness; there is also an Eternal Power, not ourselves, that makes for beauty, and this is the only unerring critic of poetry. What is to be the future of American literature? Ask the Supreme Powers, rather than the Boston critics! How long are our best productions to express the heart of the ages? Ask the Court and the Throne, and not New York or Cambridge or Concord! It is turning out, here in America, that only those who live near the Throne can be enthroned. We reverence permanently only the authors who live near the Court. Probably *Thanatopsis* is the earliest American poem that will be remembered five hundred years hence; but that production is not yet seventy years old. This is the seventieth birthday of Whittier, and he is older than American poetical literature. Our New England prose and poetry think much of themselves, and the world thinks much of them; but what do the Supreme Powers think of American literature? Their opinion ought to be ours.

Undoubtedly the American literature of the future will be largely influenced by our past; and so we ought to thank Providence that in the first two hundred years of our development we have not had a Byron, great or small, and that no Sardanapalus rules our cities of the soul as yet. Now that woman has come into literature, it may be hoped that English poetry, in spite of a Swinburne now and then, is permanently purified; and we are English. "The American," Lowell says, "is the Englishman reinforced." All English literature up to Milton is the hereditary personal property of Americans as much as of Britons. Our poetry has native roots not only in Shakspeare and Chaucer, but also in Virgil and Homer. On the spiritual map Boston is nearer Athens than is any capital of Europe. When a Schliemann uncovers at Mycenæ one of the heroes of the Iliad, American Hellenism stands at the tomb with bated breath. A shiver of gladness runs through all articulate speaking men, when Homer is found to be not a myth, but a person in whom even a Gladstone can believe as a reality.

The roots of the literature of America, however, are watered from a very peculiar atmosphere; and it may well be that the coloring of our poetry in the future will take something of breadth from our democratic development. It is a strange thing, that one of the English schools of criticism finds the best American poetry in the savage prose halloo of a Whitman. His barbaric, literary war-whoop, a few think distinctively American. If the breath of it

could be modulated somewhat, if the patriotism in it could be retained, and adequate respect for the canons of both taste and morals infused into it, no one would object to the distinctively American traits in his uncouth anthems.

Two oceans, and many rivers and lakes and mountain-ranges, have yet to lift up their voices in American song. We have still to learn what the great Sierras can do for literature, and what the Yosemite can say to our poets. On the barren shore of New England our harp has been struck in presence of the Atlantic and of historic memories. England is in sight from Boston, but not from the Yosemite. America catches the proper key-note for her harp only when she takes her seat on the ridge of the continent,—the Rocky Mountains and the Andes,—and listens to those coming ages of which the noise as yet is but an obscure rustle. She has reasons for believing that ultimately American audiences will be as large as all the rest of the world. She sits on the heights of the Sierras, and remembers that she has eleven million square miles of arable land in North and South America, while all Europe, Asia, and Africa together have only ten million square miles through which the plough can be profitably passed. Although less than half the size of the Old World, this continent, as scholars assure us, can maintain a larger population than the Old. The Rocky Mountains and the Andes, as a central line among the inhabitants of the crowded age of the planet, are likely to be the heights from which ultimately the greatest

assemblages of men may be addressed. I look toward the sunset for the Parnassus of the future. The chief notes of the American harp may yet be struck in sight of the Pacific. As dwellers in a land which Hegel loved to call the continent of the future, we may well patronize that which is distinctively national.

If we have ever had a national lyrist laureate, has that poet not been he whose spirit, like a flame of Hebrew fire, moved before us in the dark days of the anti-slavery contest, and more effectively, I think, than any other one poetic light, guided us across the sands and through the waters to the promised land? [Applause.] There are three circles of leaders of thought: those who are in the universities, and teach what has already been established; cultivated men outside the universities, and who are pioneers often; and then, above these two ranks, we have the prophets, or those singers who are near the Throne. If on this continent the poet is to be pointed out who more deeply than any other has caught the tone of the Court in things ethical,—I will not say in those æsthetical, for in those, too, the Court has a fashion of its own which it is a merit to copy,—that poet is John Greenleaf Whittier. Germany thinks he has the deepest heart among American singers, and compares his religious lyrics to Luther's. It was once my fortune to hear Whittier say, "How uncouth much of my literary work is, compared with that of the great poet of the Charles! I have never been able to satisfy myself in art. It was often

necessary for me to write hastily to meet public events." Most touching is it to hear a soul all naphtha and fire berate itself for æsthetic deficiencies. We shall pardon any poet much in the rhythms of his verse if the rhythms of his heart are in perfect accord with those of the great melodies of the Court. He who speaks before the Throne is adequately approved, if the King crowns him. [Applause.]

American and all other literature will undoubtedly take coloring from science of many kinds. It is not improper for us to remind ourselves that some of our leaders of research in its merely physical departments are urging us to make more and more of the revelations of the microscope and scalpel when we open our mouths to sing. Tyndall has had an aspiration, perhaps the deepest in his life outside of his career as a physicist, to be the prose-poet of nature. "The position of science," he says, "is already assured, but I think the poet also will have a great part to play in the future of the world. To him it is given, for a long time to come, to fill those shores which the recession of the theologic tide has left exposed; to him, when he rightly understands his mission, and does not flinch from the tonic discipline which it assuredly demands, we have a right to look for that heightening and brightening of life which so many of us need. He ought to be the interpreter of that Power which as Jehovah, Jove, or Lord, has hitherto filled and strengthened the human heart." (*Fragments of Science*, p. 106.) What if the scientific tide itself is a theologic one? What if every scientific fact has a religious side?

When we have poetry which can fly with all the constellations of the sky of culture, and utter to the music which the morning stars sang together the deepest truths of physical and ethical science, we shall no longer have national poems merely. God will give them a great future yet, no doubt. But the supreme poetry of time to come is not to be national, but international. We are to have harps struck, I hope, that will rise into the region of universal laws in things ethical and physical, and proclaim what all men will be glad to transmute into life, not only on the Andes and the Rocky Mountains, but at the feet of the Himalayas, and under the shadows of the hills of China.

It is the will of God, apparently, that men should all have fair chances. The poet of fair chances is the poet of the future. Wherever a human heart beats, there the chords of American literature are likely to be listened to, provided they are struck according to the new key-note of our own democratic heart. There is much more ground for hope that American poetry may obtain a cosmopolitan hearing than that any other poetry on the globe will do so. The drift of history for one hundred years has been toward freedom politically. More and more, as time unrolls, it is to be hoped that the Throne and the Court in all their fashions are to be reverenced in the spirit of theocratic equality among men. The poets of loyalty to all the fashions of the Court are those who will be crowned by the Court.

The forests grow out of the air much more than from the soil. Spiritual atmospheres, and not our external literary fashions, build poems. When we see in the short turf of the upland pastures the filtering threads of rain-water in the summer shower, we know that they come out of the sky, and that they nourish the roots of the mighty pines. So with the poetic forests that lift their sable, resounding spires of evergreen into the heavens, and cast their brown sheddings upon the scented gloom of sacred study and emotion beneath them. They are the children of the air. Great poetry has always been the offspring of deep ethical convictions. The mood which produces poetry of permanent power has thus far in history been closely connected with the religious spirit. Natural scenery is not the important matter for poets, but the scenery of high belief is. If America is to be a Sahara, if a sirocco of doubt is to wither her olives, if we are really to be so frightened when sectarists sneer at illiberality, as to fear to call God, God, and to say that it is wrong to steal, then there will be no pine-forests, however perfect the soil. It is the air, it is empyrean thought, it is emotions rained out of the azure, which nourish the deep heart of æsthetics. More and more our American civilization will need to build itself out of the rains and dews, and therefore more and more out of its ethical, scientific thought, if the harp of America is to be heard around the world. A new Muse is set before the ages. The Court has many quite settled standards, ethical, æsthetic, social; and

only he who speaks in the tones of the Court can be heard far and long.

I sing to her who sits in white,
The brightest of earth's latest light ;
Her throne an entire jasper stone
Where earth and heaven meet in one ;

End of the future's vistas vast,
Best birth of ages, — best and last,
In knowledge ripe, in virtue whole ;
Ideal of perfected soul.

Far sits her form now, — ages far,
Her holy face seems yet a star ;
But, as the ages to her run,
The star enlargeth to a sun.

She beckons me, and I am awed ;
She is my Muse ; she is like God.
Her look doth Time with God infuse
God, God, God is the only Muse.

[Applause.]

THE LECTURE.

If chemical combinations account for living tissues, what accounts for the chemical combinations?

[Applause.]

Let science never cease to make petitioning signals at all doors where the law of cause and effect puts up bells and knockers. To him that knocketh in the name of that law, it shall be opened. Again and again we are told by materialistic science, that some doors are not to be approached ; that some laws are incomprehensible ; that it is absolutely beyond the

capacity of the human mind to understand the cause of certain changes which result from the action of bioplasmic matter or germinal points. Adhere unrelentingly to clear ideas. If chemical combinations cause the formation of living tissues, it is very sure that something has caused the chemical combinations. Have they caused themselves? Face to face with the facts of biology, dare you adopt the dicer's theory of the universe?

Life or mechanism—which? is the question in debate concerning living tissues. We have many specious, glittering pleas made in support of the mechanical theory of life. In reply, the opponents of materialism bring into court the living tissues themselves. They exhibit the results of the latest exact research into the difference between the living and the lifeless forms of matter. They spread out in biological charts the resplendent certainties which illustrate the laws of the growth of all living things [referring to charts on the platform].

Aristotle defined life as "the cause of form in organisms." Herbert Spencer defines it as "the definite combination of heterogeneous changes, both simultaneous and successive, in correspondence with external co-existences and sequences." I prefer Aristotle's definition. It has been a part of the audacity of this platform, to define life in connection with physical organisms, as *the power which co-ordinates the movements of germinal matter*. Permit me to recur to that definition in replying to Maudsley's pretence, and that of Spencer, and of the whole school of ma-

terialistic, as distinguished from theistic, evolutionists,—namely, that axioms, intuitions, necessary beliefs, self-evident truths, are themselves only the result of our habits; an outcome of inheritance through physiological causes, brought into activity as the race and its animal progenitors have been, age after age, boxed about by their environment from the jelly-speck up.

There has been one conscience in this world such that the ages have felt that its laws reveal the very nature of things. "Development," as Newman Smyth remarks, "must account not only for man, but for the Son of man." The conscience, which was the author of Christianity, must have been the result of development, if materialistic theories are correct.

The moral sense, we are told, is only the sequel of an accumulation of nerve-tracks in the brain. We cannot say that our fundamental beliefs would not be different if our environment had been so. The central propositions, or necessary beliefs, on which all scientific discussion has relied up to our day, are now themselves to be brought into question in the name of hereditary descent. Stuart Mill used to affirm that there may be worlds in which two and two do not make four. Even the mathematical axioms he would explain as the result of operations of the laws of association. Herbert Spencer, however, thinks it very wild to account for our necessary beliefs by individual experience merely. It is now pretty generally conceded, that what we take in from our finger-tips and other senses will not, by the laws

of association merely, account for our primary beliefs in self-evident truths, and especially not for our convictions that certain propositions hold good beyond the range of experience. It is asserted, however, that, if our individual experience will not thus account for our necessary beliefs, that of our ancestors will. We have not had a trial long enough to account for our certainty that every change must have a cause, and that two straight lines cannot enclose a space; but our race has had a trial sufficiently long for that purpose. We are giving up, in the conflict with the materialistic and with the associational school in philosophy, any very elaborate attacks upon the theory that all our necessary beliefs come from individual experience. Faint and few are the soldiers that stand in the line of the defence of that proposition at the present day. But many, and bold, and exceedingly hopeful are those who would account for our necessary beliefs by hereditary descent, that is, by the experience of the race, not only since we became men, but during all that time when we were being lifted by the law of development from inorganic matter.

Allow me to give a general reply to this precious theory that our necessary beliefs are derived from the experience of our ancestors, and then to descend little by little into detail. If all my necessary beliefs, intuitions, first principles, come from experience, either of myself or of my race, then my convictions ought not to outrun the range of the experience either of myself or of my race. You cannot

logically put more into your conclusions than you have in your premises; but it is beyond all controversy that the experience of myself and of the race has been finite. A little while ago there was no life on the planet. That principle of life which has culminated in me has not had experience beyond the North Star. But we have some convictions that have a far wider range than the circuit of the polar light. Stuart Mill does not deny that we are bound to believe, or incited by our organism to have confidence, that every change must have a cause beyond the North Star, as well as on the earth. We feel very sure that two straight lines cannot enclose a space in the sun any more than they can on Beacon Hill. We have entire confidence that sin in the Pleiades, just as here, can be the quality of only voluntary action. We believe that necessary truths, self-evident propositions, hold good for all time and all space. With no sense that we are doing any thing audacious, we sweep self-evident truths through the whole extent of the infinities and the eternities, and feel as sure of their truth beyond the range of our experience as we are inside the range.

Thus far there is no dispute. All that the materialistic school says in reply is, that convictions which outrun experience are illusions. Goethe said, and it is the keenest speech Mephistopheles ever made, "Whom God deceives is well deceived." It is assumed that our convictions, which outrun experience, are the result of illusions, represent no outward reality, might have been different had our environment

been different; and thus we are thrown into unrest as to self-evident truth itself. If this unrest is justifiable, then what we thought to be adamant under our feet, is rocking on a deck afloat. We are not sure that every change must have a cause. It is assumed by some, that all we can assert is that every change *has* a cause,—not that it *must* have. By others it is supposed simply that every change within our field of vision has an antecedent which we call a cause; but we are not allowed by that school to assert that there is any efficient connection between what is called the cause and the effect.

It is our duty to ourselves to test these unnatural theories by clear ideas. We are not bound in this assembly to any school in philosophy. We have here but one fundamental tenet: the clear first, the clear midst, the clear last, and, in the clear, the true. We care not what school goes up or down: we care for clear ideas. [Applause.] Let us study some part of the uniform experience of the race, and see whether it has taught us any proposition which we cannot reverse in imagination. I suppose the sun has always risen in the east. My ancestors probably never saw it rise in the west; and by my ancestors I mean the polyps. If the sun ever has risen in the west, no record of the fact has been preserved; the colossal circumstance has made no impression on human history. We may, I think, fairly suppose that the sun has always risen in the east. There has been a uniform experience of the race, from the first, of sun-risings and star-risings in that quarter of the

heavens. Well, it turns out that it is very natural for us to look for the sun in the east, but is it impossible for us to imagine that the sun might rise in the west? Not at all. It is perfectly possible for me to imagine that to-morrow morning the orb of day might come up from behind the pines of the Rocky Mountains instead of from beneath the watery shoulder of the planet visible from this Massachusetts coast. I can imagine such a geological convulsion as might reverse the motion of the earth, and give us a new order of celestial phenomena, in spite of the perfect uniformity of our experience as a race in regard to these celestial movements.

But, now, can I imagine it possible that two straight lines can enclose a space? Not at all. The moment I understand what two straight lines mean, I see that they cannot enclose a space. It is impossible even to imagine the annihilation of space or time, or that things that are equal to the same thing are not equal to each other, or that a whole is less than a part. But my race has had as uniform an experience as to the sun rising in the east as it has had concerning these axiomatic propositions. It is possible, however, to imagine that the sun might rise in the west, and not possible to imagine that a part is as great as a whole. There is an inconceivability in regard to the latter proposition which does not exist in regard to the other. My ancestors have had no greater number of instances of experience of the whole being greater than a part than they have had instances of experience as to the heavenly bodies rising in the

east. Four thousand heavenly bodies, visible to the naked eye, rise in the east every day. *Experience has been just as uniform about the sunrise as it has been about any mathematical axioms; but you can, in thought, reverse the motion of the sun, and you cannot reverse, even in thought, a mathematical axiom.* (See *Boston Monday Lectures on Transcendentalism*, pp. 12-25.) Those are self-evident truths of which the opposites are not conceivable. They reach beyond all experience; for we feel sure that they are true beyond the North Star and in all the constellations. They were true in all past time, and will be in all time to come. Now, if the uniform experience of ourselves and ancestors is the origin of both these classes of convictions in our minds, why is there such a difference in the way the mind acts when we bring it face to face with the conceivable and the inconceivable as to each class? There are propositions of which the opposite is utterly inconceivable. They reach beyond the range of experience infinitely in time and in space. *Experience cannot account for what goes beyond experience. The universal, self-evident truths of the intellect and conscience, therefore, cannot be deduced logically from the finite experiences either of the individual or of his ancestors.* [Applause.]

To descend now to detail, let me emphasize a few of the differences between living and lifeless matter: —

1. Living beings retain their identity in spite of the constant change in the particles that compose

their organisms. Inorganic masses lose their identity with the change of their particles.

Plymouth Rock is composed of atoms of granite; and if you wash away all these atoms, and little by little substitute others for them, when you have effected a change of physical identity, Plymouth Rock is no longer Plymouth Rock. But here is Webster, who stands on Plymouth Rock to make an oration; and there is not in his brain, or in any part of his living tissues, a single atom that was there seven years previously, or perhaps not a single one that was there twenty months ago. But Webster is Webster in spite of the frequent loss of his physical identity. Your living being retains its identity in spite of the change of its particles; your dead matter does not; and here is one hint of the breadth of the colossal chasm between living and lifeless forms of matter. [Applause.]

2. In living matter the component atoms are in a state of unstable equilibrium, which chemical and physical forces are constantly endeavoring to overset. In lifeless matter these forces reduce the atoms to a condition of stable equilibrium.

The tissues of all living things, when exposed to chemical forces alone, tend to revert to the condition of inorganic matter. When life departs from the body, chemical laws reduce the organism to dust. This shows how unstable is the combination produced by the bioplasts, and how inadequate chemical forces are to account for the power which in life prevents that equilibrium from being overset. (See

BOWNE, Professor, *The Philosophy of Herbert Spencer*, pp. 95-106.)

3. Organic matter grows; inorganic matter does not. The former increases by selective assimilation, the latter by accretion. What is added to the one gains no new properties: what is added to the other takes on new powers.

When I roll my snowball in the snow, what is added is snow after it is added. When Plymouth Rock is rolled in the sand, the particles which are taken up acquire no new properties. But, when new matter is added to living tissues, it takes on new properties. It is as different from the old as life is from death. Gases, food of various kinds, are absorbed by the bioplasts, and changed into germinal matter which has a power of weaving all the tissues of the body. Such new properties are given it, that we have in one place a nerve, in another a muscle, in another a tendon, in another a cellular integument. This action is altogether different from that of inorganic matter, and implies a power higher than chemical, and co-ordinating all these activities.

4. Established science teaches that the molecular atoms are always the same. They change their combinations, but not their individual qualities.

Clerk Maxwell has written a famous essay on molecular atoms; there has been elaborate investigation of this topic by many physicists, and it is now generally conceded that the ultimate particles of matter never change their shape or their properties. It follows that you cannot draw life out of

these molecular atoms at the end of any process unless you put it in at the beginning.

5. Here are the atoms ; they do not change their qualities, but only their combinations. Very well, then : if you will allow me to use an algebraical symbol, we know that in the combination of atoms a is always a , and not a plus b or a minus b . Whatever combination a molecular atom enters into, it is always itself, and not itself plus something or minus something. Unless life is involved in the molecular atoms of inert matter, you will not evolve it out of their combination. Spencer admits this, and so brings forward the theory, in his biology, of "compound molecular units," whatever that may mean. Compound units! "*E pluribus unum*," indeed! A man cannot be in the American Union if he is in none of its States.

6. Living tissues are co-ordinated according to definite plans.

7. As every change must have an adequate cause, we are compelled to infer the existence of a co-ordinating force behind the action of the bioplasts in each organism.

8. That force is the cause of form in organisms.

9. It has as many types as there are types of organisms, vegetable and animal.

10. We do not find in chemistry the co-ordinating power which is the cause of form in organisms. But incontrovertibly there is a power which co-ordinates the action of these germinal points, for they are co-ordinated.

11. As the co-ordinating power which is the cause of form in organisms cannot be found in matter, it must be looked for outside of matter. Like any other cause, its nature must be judged of from its effects.

Any man who has stood face to face with the results of microscopical research in the last twenty years will, I think, be very slow to adopt any other than Aristotle's definition of life. Perfectly parallel with that definition is the one given here.

12. Life is the immaterial co-ordinating power behind the movements of germinal matter.

That definition having been defended by me at great length previously, I shall now use our former conclusions. From the point of view reached in thirteen lectures on Biology (see vol. i. of the *Boston Monday Lectures*), I must begin — and I can only begin to-day — a reply to Maudsley.

1. Germinal matter, or bioplasm, increases in quantity as living tissues grow. Once every living thing was but a single naked mass of bioplasm.

2. With the increase of quantity there is an increase of the force in the germinal matter.

Your naked, throbbing mass of bioplasm takes on a wall, and divides and subdivides, and weaves the walls of its cells into tendon and nerve and muscle, and coils these around each other, according to a predetermined plan. One-fifth of the bulk of the mature organism is made up of germinal matter. One bioplast develops into many.

3. This increase is derived from the assimilation of inorganic matter.

The individual cell takes in nutrient matter from without, transforms it into living matter, and throws it off as formed matter. You remember that there are but three kinds of matter in living tissues,—nutrient matter, living matter, and formed matter. The inorganic is changed into the germinal ; the germinal throws off the formed ; and, as your bioplast divides and subdivides, no doubt the matter which it weaves into these various structures is derived from the inorganic world.

4. Maudsley asks how we know that the movements of germinal matter, which are sustained by inorganic matter, did not originate in inorganic matter.

He says, “Admitting that vital transforming matter is at first derived from vital structure, it is evident that the external force and matter transformed does, in turn, become transforming force — that is, vital. And, if that takes place after the vital process *has once commenced*, is it, it may be asked, extravagant to suppose that a similar transformation might at some period have *commenced* the process, and may ever be doing so? The fact that in growth and development, life is continually increasing from a transformation of physical and chemical forces is, after all, in favor of the presumption that it may at first have so originated. And the advocate of this view may turn upon his opponent, and demand of him how he, with a due regard to the axiom that force is not self-generative, and to the fact that living matter does increase from the size of a little cell to the magnitude of a human body, accounts for the continual production of trans-

forming power? A definite quantity only could have been derived from the mother structure, and that must have been exhausted at an early period of growth. The obvious refuge of the vitalist is to the facts that it is impossible now to evolve life artificially out of any combination of physical and chemical forces, and that such a transformation is never witnessed save under the conditions of vitality." (*Body and Mind*, English edition, p. 169.)

Probably Maudsley's is the acutest question that English materialism has ever asked. For one, I agree most cordially with Professor Bowne of Boston University, in his work on "The Philosophy of Herbert Spencer," when he says (p. 104) that "this is the best thing the correlationists have said yet, and it is the best that can be said." Wishing the whole force of this argument to be appreciated, I have cited Maudsley at length, and am anxious that he should be read, not only in his new edition of his "Physiology of Mind," 1877, but in his essays on "Body and Mind," 1873. The latter work contains a suggestive paper on "Conscience and Organization."

Maudsley is not to be disputed when he says that the germinal points absorb inorganic matter, and that they transform it into other bioplasts and the various tissues. As their power evidently grows by acquisition of power from inorganic matter, who knows but that it commenced so? That is, who knows but that spontaneous generation may be a fact, or that there is any co-ordinating power behind these rhythmically moving co-ordinated germinal points? That

is the objection ; and that, I suppose, is the Malakoff of English materialism.

5. My reply is that when I define life strictly as the co-ordinating power governing the movements of germinal matter, I do not know that *this* power is increased by the multiplication of the bioplasts. *The power of co-ordination is the subtlest power in life ; and this power resides in the original germ ; and we do not know that it is increased by the growth of the living subject.*

I admit that chemical forces are drawn into the labyrinth of activity in the living tissues, but not that the co-ordinating power behind the bioplasts is increased. Very evidently that power is not changed, for the plan of an organism is the same from first to last, through its whole growth.

We do not know that the weaver is any more skilful when the web is half woven than when he has merely set the web, and first begins to throw the shuttle.

There is an increase in the amount of power manifested by the organism ; but there is no increase in the co-ordinating power, which is what materialism never accounts for.

The weaver has just as much co-ordinating power when the web is arranged for the first stroke of the shuttle as he has after it is woven, and the finished product is held up in its glory before admiring eyes. The co-ordinating power is what I call life ; and in the germ of your eagle, your man, your lion, your swallow, that co-ordinating power has a law such

that there cannot come out of the germ of the lion a swallow, nor out of the germ of the swallow a lion. Every thing under the law of hereditary descent breeds true to its kind. I do not see that there is the slightest evidence that this co-ordinating power is increased. The reply to Maudsley is, therefore, contained in that definition of life upon which I have just insisted. Give me, as a statement of what life means, this phrase, the co-ordinating power which directs the movements of germinal matter, and I will defy Maudsley to prove that the co-ordinating power *is* increased by the growth of organisms; for just as much of it is needed in these first strokes as in the last, and one would think a good deal more. [Applause.]

Very great conclusions follow from defining life as the co-ordinating power directing the movements of germinal matter:—

6. The first law of hereditary descent is, that every living thing reproduces its own kind, and no other kind.

7. The co-ordinating power which we call life lies behind this law of hereditary descent.

8. A cause must precede its effect.

9. The co-ordinating power which is the cause of form in organisms must exist before the organization which it causes.

Even Haeckel and Huxley hold that life is the cause of organization, and not organization of life.

10. Transmitted co-ordinating power, therefore, does not depend on a physical environment for its

existence or its habits of action, by which it always breeds true to its kind.

11. The transmitted co-ordinating power is, therefore, a capacity not dependent on experience.

12. But this transmitted original co-ordinating power in man contains the plan of his soul as well as of his body.

13. That plan has peculiarities which in man bring into existence the intuitions and self-evident truths, or what are called innate or connate ideas.

14. The self-evident truths, the intuitions, the laws of the necessary beliefs, including those of conscience, are, therefore, not the result of experience, but original parts of the transmitted co-ordinating power in man, and independent of the co-ordinated organism.
[Applause.]

III.

NECESSARY BELIEFS INHERENT IN THE PLAN OF THE SOUL.

THE NINETY-THIRD LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, DEC. 24.

Nihil est in intellectu, quod non fuerit in sensu, nisi ipse
intellectus.—LEIBNITZ: *Nouveaux Essais*.

Our birth is but a sleep and a forgetting:
The soul that rises with us, our life's star,
Hath had elsewhere its setting,
And cometh from afar:
Not in entire forgetfulness,
And not in utter nakedness,
But trailing clouds of glory, do we come
From God, who is our home.

WORDSWORTH: *Ode on Immortality*.

III.

NECESSARY BELIEFS INHERENT IN THE PLAN OF THE SOUL.

PRELUDE ON CURRENT EVENTS.

IN the possible, I do not say in the probable, future, there lies, at a distance of not more than three centuries, an alliance, not a union, of Great Britain, the United States, Australia, India, belting the globe, and possessed of power to strike a universal peace through half the continents and all the seas. The disbanding of large standing armies among English-speaking peoples would be one majestic end attainable by this majestic means. Great Britain alone now virtually rules the waves. Except in India, an alliance of the English-speaking peoples of the world could be attacked only from the sea. But the fleets of an American-Anglican commercial league might easily govern the oceans. Such an alliance was deliberately proposed not long ago in a speech before the Union League Club of New York, by Mr. Forster, a member of Parliament, and Mr. Gladstone's prospective successor as

leader of the liberal party in English politics. (See report in Tribune of Dec. 15, 1874.) The haughty and cautious British press emphatically praised the scheme as practicable, and to England desirable. Even so conservative a paper as the London Spectator says that such an alliance would, for geographical reasons, be utterly beyond attack from any first-class power, unless China should ever become one; and that, except in India, it could be attacked only by fleets which eighty millions of men, always foremost in naval warfare or maritime enterprise, could with no great or exhausting effort brush away from the seas. It would be open to such a league, without dangerous interventions, to secure permanent peace among nearly half mankind. Dream though it may be, this possible future naturally rises before our thoughts in the jubilant Christmas season, the first occurrence of which Milton describes in words which, God grant, may yet be true of time to come:—

“No war or battle’s sound
Was heard, the world around;
The idle spear and shield were high uphung;
The hookèd chariot stood
Unstained by hostile blood;
The trumpet spake not to the armèd throng;
And kings sat still with awful eye,
As if they surely knew their sovereign Lord was by.”

Hymn to the Nativity.

What would be some of the rules of such an alliance, Anglo-American and Australian, if the nations should ever be wise enough to enter upon its organ-

ization? Perhaps they would first agree not to enter into war with each other without trying arbitration as a remedy. Already a precedent has been set at Geneva in a famous arbitration trial, such that it would be very difficult now for English-speaking nations to accept war with each other without trying arbitration first as a method of settlement. At Geneva was spun by Clotho a thread which Lachesis twists, and Atropos seems unlikely soon to sever.

“Spin, spin, Clotho, spin!
Lachesis, twist! and Atropos, sever!
Strong is Death, and strong is Sin,
But only God endures forever.”

LOWELL.

Would free trade be the rule as to commercial intercourse? That is a difficult question, and one not to be brought up earliest in the formation of any Anglo-American alliance. But perhaps, after deciding that arbitration is to be tried before we make war with each other, we should agree that arbitration is to be offered to every nation that purposes to make war on us. Our example in favor of this measure might strike peace through many a minor kingdom. The make-weight of the political influence of an Anglo-Saxon alliance, thrown into the scale of bloody war, would often be enough to bring contending peoples of no great size to peace. Perhaps uniform standards of weight and measure and money would be adopted throughout such a league. Possibly patent-laws would cover the whole territory of the alliance; perhaps copyright would. Of course

international law, which already begins to be codified, would advance to new details and enlarged honor. After these earlier and smaller strands should have been tied, there might come a day when the question would be raised, whether all ports of this alliance should not be open to free trade. Having once adopted arbitration as an international law, shall Great Britain and the United States treat each other as enemies in trade, although friends in politics? There is much to be said against free trade; but probably an English-speaking alliance would at last drift into it. What inspiration would come to commerce with free trade among all English-speaking peoples in the whole world! [Applause.] What encouragement would come to all friends of peace if commerce were to be made a missionary for peace, not only in England, but in Australia, and in America as well! If the Anglo-American alliance of the possible future were to become, in the interests of commerce, a missionary of peace in all seas, it surely would be the same in all continents. Our ocean lines of transit are now so connected with the railways and telegraphs, that an alliance able to manage the seas would also need to assert its power over many large lines of railway transit; and so, little by little, commerce, after managing the water, would manage the land in the interest of peace.

How much power would there be behind such an alliance? What would be the strength of its numbers? We have in Great Britain forty millions

of people, and in the United States more than forty millions. Here in Canada and British America are four millions, and in the West Indies and Guiana another million and more. Then we have in Australasia two and a half millions belonging to the British Empire. We have in the scattered Eastern possessions of Great Britain more than three millions of people. We have in Africa one million and a half who are ruled by Queen Victoria, and in India two hundred and forty millions of whom she is the empress. What, now, if all these scattered millions should be united? we should have about three hundred and twenty-five millions in an Anglo-American alliance, or very nearly a quarter of the population of the world. At another centennial of our country and of the British Empire, more than a quarter would be inside this possible league. The Sandwich Islands would probably join such an alliance. Would progressive Japan do so? Would Egypt? Would Greece?

The Pacific would be to an alliance of all English-speaking peoples only what the Mediterranean was to the Roman Empire.

Such a league might finally adopt the supreme measure of defending itself as a unit in case of attack. That would be, perhaps, the last thing arrived at, after free trade had cemented us. But give me these four regulations, — no war without arbitration between English-speaking peoples; arbitration to be offered to every nation that attacks such a league; common laws as to patents, copyrights, and money;

and, lastly, free trade, — and I, in spite of Washington's remarks about the danger of entangling alliances, dare predict that the time will ultimately come when the English-speaking league will defend any one part of itself by the force of all its parts. What good would this accomplish? It would make the nearly complete disbanding of standing armies safe in all English-speaking nations. It would reduce the size of armies on the Continent of Europe, although Germany and France might not belong to such an alliance. One part of the force of Germany is kept up because of the power of Great Britain. Not only is France her neighbor, but England is also; and Germany, although not given to making war, is given to such preparations for war as to make peace advisable to all her neighbors. The portion of the alliance openest to attack from the land would be in India. The league could be attacked from Russia better than from any other quarter. But *join three hundred and twenty-five millions of people, let them say that they will have peace with each other, and, all history for it, they will ultimately have peace with the world.*

[Applause.]

Your Charles Sumner stood here years ago, and made a speech for peace; but it was his stern fortune to pass through life a sentinel on the edge of the most terrific civil conflict the world ever saw, except one, — the Thirty Years' War. He had far forecast, and regarded our battles as only a police movement for the execution of the laws. He did not admit that his peace principles were fundamen-

tally compromised by any thing he did in support of the Union during our civil conflict. It was the dream of many cultivated men in Boston and Cambridge twenty-five years ago, that we had come to an era in which wars were to be unpopular with culture throughout the world. It is the dream of many men of culture yet, that such an era is ahead of us. Our great commissions for the discussion of international law, and for the arrangement of common rules in commerce, are full of hope to-day, although most of their members are lawyers and dry men of the world, that self-interest will ultimately prevent war between people of the English-speaking class. Is it altogether too early for us to look upon our Peace Societies as timely organizations? Are they not a promise to which at this season we may well listen as to a bugle calling us from afar, and having in it more hope than was in the bugles heard at Lucknow? "England and America," wrote Carlyle to Dickens in 1845, "are properly not two nations, but one; inseparable by any human power or diplomacy; being already united by Heaven's Act of Parliament and nature and practical intercourse; indivisible brother elements of the same great SAXONDOM, to which in all honorable ways be long life." When Charles Sumner's oration for peace was made, not a few circles of culture were inclined to think that Tennyson sang something authoritative when he said, —

"I dipt into the future far as human eye could see,
Saw the vision of the world and all the wonder that would be,

Till the war-drum throbbed no longer, and the battle-flags were
furled,
In the parliament of man, the federation of the world.”

Locksley Hall.

You say that these words are outgrown ; but a late poetess, whom England loves to call Shakspeare’s daughter, was to the very last hour of her life inclined to the same opinions. It ill becomes us dull people, when a Mrs. Browning sings ahead of us, not to see her spirit from the Unseen beckoning England and America and the ages to the final realization of her own ideal :—

“ Rise : prefigure the grand solution
Of earth’s municipal insular schisms —
Statesmen, draping self-love’s conclusions
In cheap vernacular patriotisms.
Bring us the higher example : release us
Into the larger coming time.
No more Jew or Greek then — taunting
Nor taunted : no more England nor France,
But one confederate brotherhood, planting
One flag only, to mark the advance,
Upward and onward, of all humanity.

“ National voices, distinct yet dependent,
Ensphering each other as swallow does swallow,
With circles still widening and ever ascendent
In multiform life to united progression.
These shall remain.

“ Each Christian nation shall take upon her
The law of the Christian man in vast :
The crown of the getter shall fall to the donor,
And last shall be first, and first shall be last,
And to love best shall still be to reign unsurpassed.”

Italy and the World.

THE LECTURE.

When we hear the noise of the falling water, or the hiss of the steam which drives a loom, we do not confuse the power of these agents with that of the weaver. The unintelligent forces of the waterfall or the steam are contrasted with the weaver, much as the blind chemical and physical forces at work in living organisms are contrasted with life. You know that the steam and the water cause the movements of the loom, and yet that the weaver co-ordinates those movements. The rude, sightless forces of the waterfall and of the steam may be essential; but they do not construct the machinery which they move, and there can be no weaving until there is a loom. Even after the appropriate mechanism has been brought into existence, you must have the weaver to co-ordinate its activities. He does not put forth all the force there is in the loom, but he co-ordinates it all. Surely there is a distinction between *co-ordinating*, and *causing* the movements of germinal matter. Sometimes the weaver makes the loom, and moves it, too. In this life, chemical and physical forces play through the organism; but when we drop the natural, and acquire a spiritual body, perhaps the change is analogous to that which occurs when a weaver, whose loom has been moved by a waterfall or steam, dispenses with their aid, and sets the loom in motion by his own force.

In the defence of the authority of the necessary beliefs, or axiomatic truths of the intellect and con-

science, against the pretences of materialism, what are some of the uses which can be made of a just and verifiable definition of life?

1. Correctly defined, life in physical organisms is *the power which co-ordinates the movements of germinal matter.*

2. This definition is not intended to apply to disembodied life, nor to the Divine Existence.

It is a definition, not of life merely, but of life in physical organisms.

3. It is identical with Aristotle's definition of life as the cause of form in organisms.

4. Co-ordination, the greatest marvel in the structure of living tissues, is, by this definition, put in the foreground.

5. But the co-ordination of the movements of germinal matter or bioplasm only is mentioned, for no other form of matter in living tissues has the power of movement.

Inorganic matter does not move, formed matter does not move, except as each is moved by the bioplasts. To account for the changes in the position of the former, we must therefore fasten our attention on the movements of the latter. The defect of Spencer's, and of many other attempted definitions of life in physical organisms, is that such life is not spoken of as connected always with germinal matter. Spencer is justly criticised by Drysdale for not confining the range of his definition to this peculiar kind of matter called bioplasm. (DRYSDALE, *Protoplasmic Theory of Life*, London, 1874, p.

176.) It is now conceded even by Huxley that life exists only in the matter of the bioplasts. Where life came from, he says, we do not know; but we do know, that, so far as human observation has extended, life has been found only in connection with bioplasm. Therefore, in the definition of life in physical organism, bioplasm must be prominently mentioned.

Why not say that life in physical organisms is the power which co-ordinates the movements of the bioplasts? Because there are individual animalcules which have life, and yet consist apparently not of many bioplasts, but of a single naked throbbing mass of this germinal matter. When such an animal wishes to digest its food, it sometimes thrusts the nutriment into its side, making a stomach there, which absorbs the pabulum; and then the *débris* is removed, and the animal is whole again. This procedure evidently involves a co-ordination of movements; and we say that the action by which such an animalcule digests its food is not the result of chemical and mechanical forces merely, but of life which directs them, or of a power which co-ordinates the throbbing of that single mass of bioplasm of which the animalcule may consist. There is a co-ordination there such that a process essential to the preservation of the animal is carried through triumphantly; and the chemical and physical forces, as we have seen in previous lectures, do not account for that co-ordination. Something must account for it; and that something we call life. The power is there, for we see its effects. But when we rise to the more com-

plex organisms, the fact of co-ordination stands out before us with blazing vividness. We have co-ordination upon co-ordination, wheel within wheel; and the cause of the co-ordination we call life.

6. The definition does not assert that life *causes* the movements of the germinal points or bioplasts, but only that it *co-ordinates* those movements.

7. It does not deny that chemical and physical forces may act through the bioplasts, but only that these forces can account for the co-ordination of their action, or for the origination and preservation of form in organisms.

What follows from this definition?

It is my conviction, that, in discussing the nature of life, our faces are turned toward a land in which, sooner or later, most important discoveries are to be made. My feeling is that the debate between atheists and theists is to be settled in the country of which we now stand on the edges in biology. So far as there is a debate concerning fundamental truth, so far as the great questions concerning necessary beliefs are drawn into dispute, they are to be settled here, partly by biological and partly by metaphysical knowledge. The great Scottish-American metaphysician, President McCosh of Princeton, has spent a life in opposing the associational school in philosophy. His various defences of the fundamental truths, intuitions, axioms, and necessary beliefs, are the best that have been made in the English language, and from the metaphysical side of research, since the death of Sir William Hamilton. (See

MILL's reply to McCosh, in the third edition of his *Examination of Hamilton's Philosophy*; and the reply to Mill, in the appendix to McCosh's *Defence of Fundamental Truth*, pp. 435-470.) He said to me the other evening, what he has often said publicly, and what I therefore venture to quote: "The associational school is disappearing. It soon will have disappeared entirely. Schopenhauer and Hartmann, too, will disappear. Hermann Lotze will not. It is wise to keep now in the foreground the physiological part of philosophy, for that is the battle-field of the future." The defence of fundamental truth upon which I am venturing here is based upon physiological considerations quite as much as upon metaphysical. It is, in short, to stand upon that definition of life which I hope was defended adequately in thirteen lectures which have already been given here on Biology.

Since there is nothing so good as eyesight for the quenching of doubt on all biological questions; I beg leave to suggest to those who are not deficient in leisure, that one of the best objects they can buy, in these days of costly Christmas presents, is an efficient microscope. There is more and more use of the microscope by all students of philosophy. Sometimes serious interests are subserved even by the amateur study of biology. You can in the few evenings at your disposal, in a couple of years, make yourselves competent to read the very best specialists in biological science. Until you read them, and learn how to test their processes and to obtain

knowledge at first hand, you may find your minds full of unrest on all these great physiological and philosophical themes. Until you can approach intelligently the supreme authorities among the specialists on these topics, you may be easily misled by second-rate materialistic writers ; and, therefore, I advise you, as a guide in biological reading, to make an adequate personal study of living tissues. Perhaps it is not improper for me to hint that I follow my own advice, as it seems to be taken for granted by certain critics of the bravely anonymous species that this is not the fact. This city has the credit of having produced the best microscope in America, a kind of freak of science and fortune, a one seventy-fifth objective, and one that perhaps could not now be produced again. Photographs taken by this instrument I have lately seen commended most highly in the Paris Journal de Micographie (number for November, 1877). That microscope is at the service of this audience ; and I hope to bring to you testimony from it again and again in the course of the next few months, as I did last winter in the lectures on Biology. Some time, when the noon can be darkened in this room, I am to give you its work actually in progress on a screen here, so that we shall obtain the facts at first hand.

It has been hinted here, that Butler and Agassiz are perhaps correct in assuming that the argument for man's immortality, by striking against the possibility of the immortality of instinct, is not wrecked, but glorified. For saying precisely what Bishop But-

ler has said (*Analogy*, part i. chap. i.), I have lately been sharply assailed by some one who fights under a mask, indeed, but who from the beginning to the end of his article points out not a single error of biological fact in a discussion which he blames you for applauding ignorantly. [Applause.]

When this house is as full as it is to-day, there are in it, among the fifteen hundred or two thousand persons present, and representing all shades of opinion, at least three or five hundred liberally educated men who know what they are about; and I repel indignantly all the scapegrace scribble of anonymous writers, whether in the newspaper or quarterly press, against an audience which has been drawn together now for more than two years on the busiest hour of the busiest day of the week, simply by large and complicated themes, and not by the speaker. You have come here to listen to very imperfect discussions of very important themes; and, although I am not a native of New England, I dare affirm that there is not on this continent another city that would send out for as long a period and at such an hour an audience as large as this to study problems as complicated as those that have come before you. [Applause.] My opinions are not worth a rush; but the general agreement of five or eight hundred or a thousand scholarly persons is a sign of the times. You blame me for having allowed a renowned publishing firm, whose judgment in matters of taste is not often questioned, to preserve, in the first editions of the lec-

tures delivered here, a slight record, made not by me, but by the stenographer, of what this audience has said. Thomas Carlyle made a speech at Edinburgh, a Lord Rector's inaugural address, before scholars and the people at large. He sits down to edit his works in a costly final edition for posthumous circulation. He left in all the audience said. (See CARLYLE'S collected works, vol. xi. pp. 295-334.) It would have been my preference, as a matter of taste, to have left out what this audience said; but it is so peculiar an audience that it was thought the examples of Carlyle and Phillips—for Phillips's speeches are edited in the same way, hisses and all recorded, as they have been here—were worth following. Had I been hissed here as often as Phillips was in the days of the anti-slavery contest, I should have thought those remarks of the audience quite as worthy of preservation as the others; and, if any have thought that the audience has expressed itself partially, please let the other side be heard here, and it shall be recorded. [Applause.] I have not the honor of a personal acquaintance with fifty persons in this audience. It appears to be thought that I have paid people for coming here, and approving what may happen to be said on this platform. There are no officers in this church, and no creed either, except clearness. I am entirely free, I suppose, from bondage here, except to the law of the survival of the fittest. [Applause.] You come here for reasons best known to yourselves, and assuredly you are perfectly independent of this plat-

form. The public understands these facts. What you have said, if you please, has gone very much further than any thing I have said. Pardon me for this digression, but let me affirm that there was not a little of consideration of the matter before it was decided that what you said should be preserved in any record of the proceedings here. I repeat, that, as a matter of taste, I should have been willing to have left it out; but, as a matter of influence, and as a means of tiding readers through dry discussion, I was willing to leave it in, after the precedents of Phillips and Carlyle. I hold that my opinions are not worth noticing, but that the general agreement, week after week, month after month, and year after year, of an audience as peculiar as this, is a sign of the times; and I find that those who are most opposed to what you have said, and to its being recorded, are those who are most opposed to the opinions you have approved. [Applause.]

If we are convinced that life has been correctly defined, we can now go on to make inferences from that definition, of the most commanding interest.

1. Matter is co-ordinated in living tissues.
2. Some adequate force co-ordinates matter in living tissues.
3. The co-ordinating force must exist before it can act.
4. It must act before it can co-ordinate the matter contained in the tissues.
5. The co-ordinating force, therefore, exists and acts before the organism which it co-ordinates.

Excuse the shortness of the steps I take in the elementary stages of this argument. It is very necessary, occasionally, in following out the links of a course of thought, to use propositions that seem self-evident. The strength of an argument is in the self-evident propositions which it contains. Using often here the form of statement which the logicians call a *catena*, I shall be allowed, for the sake of brevity and clearness, to develop argument by the use of ordinal numbers for cardinal points.

6. The co-ordinating force directing the movements of germinal matter is defined as life.

7. Life, therefore, is the cause of organization, and not organization the cause of life.

8. As the cause must go before the effect, life exists and acts before the organization which it causes.

9. It exists and acts on a plan.

10. In each different type of physical organism, it exists and acts on a different plan.

11. Every living being breeds true to its kind.

We now approach wholly new matter in the shape of inferences from propositions already elaborately discussed here.

12. In the transmission of the co-ordinating force called life, the force remains unchanged in the type of its action.

Of course I am not forgetting the slight exceptions to this law, or variation in heredity; but, to speak roundly, the great rule of hereditary descent is that like breeds like.

13. The different types of organisms are implicitly contained in the co-ordinating force of their several germs.

14. The different physical organs are in the plan of this co-ordinating force.

15. The different spiritual faculties, including the conscience in the case of man, are implicitly provided for in the plan on which the co-ordinating force acts.

16. Among the faculties of the soul provided for in the plan which antedates the germ of the body, are the perceptions of self-evident truths, both intellectual and moral.

17. The necessary beliefs of the intellect and conscience are therefore in the original plan of the soul.

18. They are brought into activity by experience.

The loom is worthless unless it has something to weave. When I affirm that the necessary beliefs are connate, I do not assert that they effect any thing for philosophy before we come into contact with the exterior world, and with our own inner world. We must have something to weave, before we can produce a web. But, in spite of all that, the web is not the loom ; neither did the web or waterfall or steam produce the loom.

19. *As original parts of the co-ordinating power involved in the origination and transmission of life, the necessary beliefs of the intellect and conscience are as independent of the structure and environment of the co-ordinated organism as a cause is of its effect.*

20. As original parts of the co-ordinating power

called life, they are as independent of the habits or experience of the co-ordinated organism as the loom is independent of the water and of the steam which throws it into action, or of the plan of the web.

21. *As provided for in the original peculiarities of the transmitted co-ordinating power in man, and as independent of their own effects, the necessary beliefs cannot be invalidated by the pretence that they depend on our environment, and would have been different had our experience been different.*

Consider the marvel of a tropical forest. Charles Kingsley, with powers of description rarely matched, pictures for us the High Woods he entered on a day of which you will read the record in his fascinating book, "At Last," a prose poem from its opening to its close. Palms of twenty species towered above his head there under the torrid noon ; and around them ran vines of hundreds of kinds, fattening in the tropical sunlight. Minor shrubs sprang up, filling all the interstices of the woods. Ripened fruits, which we gather and prize as rarities, were dropping through the scented silence. On the ground he looked for refuse, but found none. He searched for the *débris* of fallen trunks, but that was no longer visible ; for such is the vigor of tropical growths, that this refuse of the woods is sucked up at once into the enlarging tissues of the vegetation standing in the soil. There are no rotting leaves and trunks in a great tropical forest. The matter contained in such sheddings is absorbed swiftly into the fatness of the vegetation,

which grows so rapidly that you may almost hear its progress. Above you are fifty kinds of birds: around you, as many kinds of animals; a million kinds of life of all sorts,—insects, birds, animals, trees, plants. And now you know, my friends, perfectly well, that every seed in that tangle of the tropics produces its like. There is, in all the collision of tendencies in that marvel of intricate forces with power striking upon power, no jostling of a pre-determined plan off its grooves. Your palm always breeds a palm, your parrot a parrot, your ape an ape, and your invisible insect one like itself. There is no shrub so lowly, there is no animal so lordly, as to be free from the power of the law by which like breeds like. The co-ordination of all these forms proceeds from some adequate cause. Wherever an organic form is produced, we find that in the origin of it there are forces at work which land on the mystic bioplasmic shore with a constitution. Our fathers, off the coast of Massachusetts, assembled in the cabin of "The Mayflower," and, before they landed, drew up a civil compact. They put foot on Plymouth Rock by no means carelessly. They landed on the American coast with a plan. Just so, in this tropical forest, although there are a million coasts and a million boats drawing near them, every boat has a plan. In the cabin of every ship that is to touch that mystic strand of the tropics, we have a council and a compact drawn up. Certain it is, that, among the million Plymouth Rocks on which the co-ordinating powers of the germs land, there is not one pressed by

a careless foot. Everywhere the co-ordinating powers land on the bioplasmic shore, each with a constitution drawn up beforehand in the cabin of its Mayflower. [Applause.]

The constitution of a germ is a compact which cannot be lightly changed. We see that there must be conflicts in the tropical forest. There are the Norse palms and the Puritan pines. Here are the Dutch and the Norwegians; here are all tribes of men represented by the different classes of vegetation. They collide; they are all under the law of the struggle for existence and the survival of the fittest; but they adhere to their types. These compacts, arranged in the cabins of the Mayflowers, are respected in spite of all jostlings of forces off their grooves. Indeed, there is no jostling of a force off its grooves, unless after ages and ages of slight variation. I am not denying the law of variation in asserting roundly the law of heredity in sameness. The plan is there as the bioplasmic boats land; and we may defy all science to deny the assertion that every thing there is in the form of the palm is in the plan that was arranged in the cabin of the Mayflower of the palm before the boat of the palm touched the coast. Every thing there is in the plan of the parrot was in the thought of the occupants of the Mayflower of the parrot before it landed. There is a constitution brought to the Plymouth Rock of every germ. In that constitution, I hold that we have a plan, not only of the form of the body, but of the faculties and intuitive beliefs of the soul. [Applause.]

Go back, however, to the time when, as some say, the types of all germs were only four in number. Darwin has never committed himself to materialistic evolution. He has always asserted that the first living germs were brought into existence by the Creator of all things. But now, if you put into these first germs a constitution that will develop on one line into vertebrates, on another into radiates, on another into articulates, and on another into mollusks, you have four fundamental forms of life, as Agassiz taught. Even when you reduce these Plymouth Rocks to four, you do not reduce the number of words in your constitutions at all. In the four constitutions of the vertebrates, articulates, radiates, and mollusks, are contained implicitly all the provisions which your millions and millions of constitutions, developed from the four, contain explicitly. These four constitutions might be reduced to one, and yet contain no fewer syllables. In the mystic constitution of your original germinal matter you have the sum of all the provisions of the multitudinous constitutions developed from it, to show, that, when God landed on the bioplasmic shore which he had himself created, he landed with a plan. [Applause.] There was in the cabin of the Mayflower which preceded the first germinal matter, a compact drawn up, and in it were the possibilities of all divergences from the first life, or the syllables describing all the multitudinously interlaced forms of vegetation and animal existence in this tropical forest. Whatever there is wonderful in develop-

ment was in the original source of the developing process; so that I am justified in asserting that the reduction of all the constitutions or types of life to four, or even of the four to one, is no reduction of the marvel of the original compact in the cabin of God's heart.

If matter is inert, we know that it does not move itself; and assuredly it is getting to be time for us to give up the theory that matter is not matter and can move itself, now that Tyndall has done so. Look into his Birmingham address, and you will find Tyndall saying that if matter has two sides,—a physical and a spiritual,—we must account for the two sides, and that it is just as hard to account for the two sides as it is to adopt the hypothesis that matter does not originate force. (See TYNDALL'S Birmingham address in "Fortnightly Review," December, 1877.) The doctrine of the lectures given on this platform is what is usually called "ideal realism,"—scholars will allow me to use the technical phrase,—the doctrine of Germany at this moment in her academic philosophy, not in her unacademic. Separate always the two great schools of recent German philosophy,—the academic and the non-academic.

The New York Tribune lately did not know who Hermann Lotze is, but it appears that Professor Wundt of Heidelberg does. (See WUNDT'S essay on German philosophy, in "Mind," October, 1877.) If any of you will read a series of articles by Lotze, that are to appear in "The Contemporary Review," or the references to him in the new quarterly called

“Mind,” or the translation of *Mikrokosmus*, which is to be given to the world soon, as I hear, by a scholar of our Cambridge, you will be able to make in English an acquaintance with this man. Probably the Tribune does not read the “Zeitschrift für Philosophie,” published at Halle. This is the foremost philosophical journal of its class in the world, and is full of the work of Lotze and of his school in modern German thought. It is unfortunate and unnatural that the literary editor of “The Tribune,” who has the public reputation of having been a friend of Theodore Parker, should appear to have no outlook in philosophy beyond the Straits of Dover, or at least none any later than those misleading glimpses which Parker caught. If this able and honored newspaper knows nothing of Hermann Lotze, it is so much the worse, not for him, but for one department of the New York Tribune. The doctrine of established philosophy in Germany is ideal realism, and that is all that I am asserting. Matter has no capacity to originate force or motion. It may transmit it, but it does not originate it; and so the power of co-ordinating tissues, or of producing life, does not belong to it. Besides matter, there is but one other thing in the universe,—mind; and so behind the movements of matter there must be mind. Although mind may be co-extensive with matter, the identity of mind and matter cannot be asserted by any one who loves clear ideas. Therefore the co-ordinating power, the constitution drawn up in the cabin of the Mayflower, is to be attributed to mind.

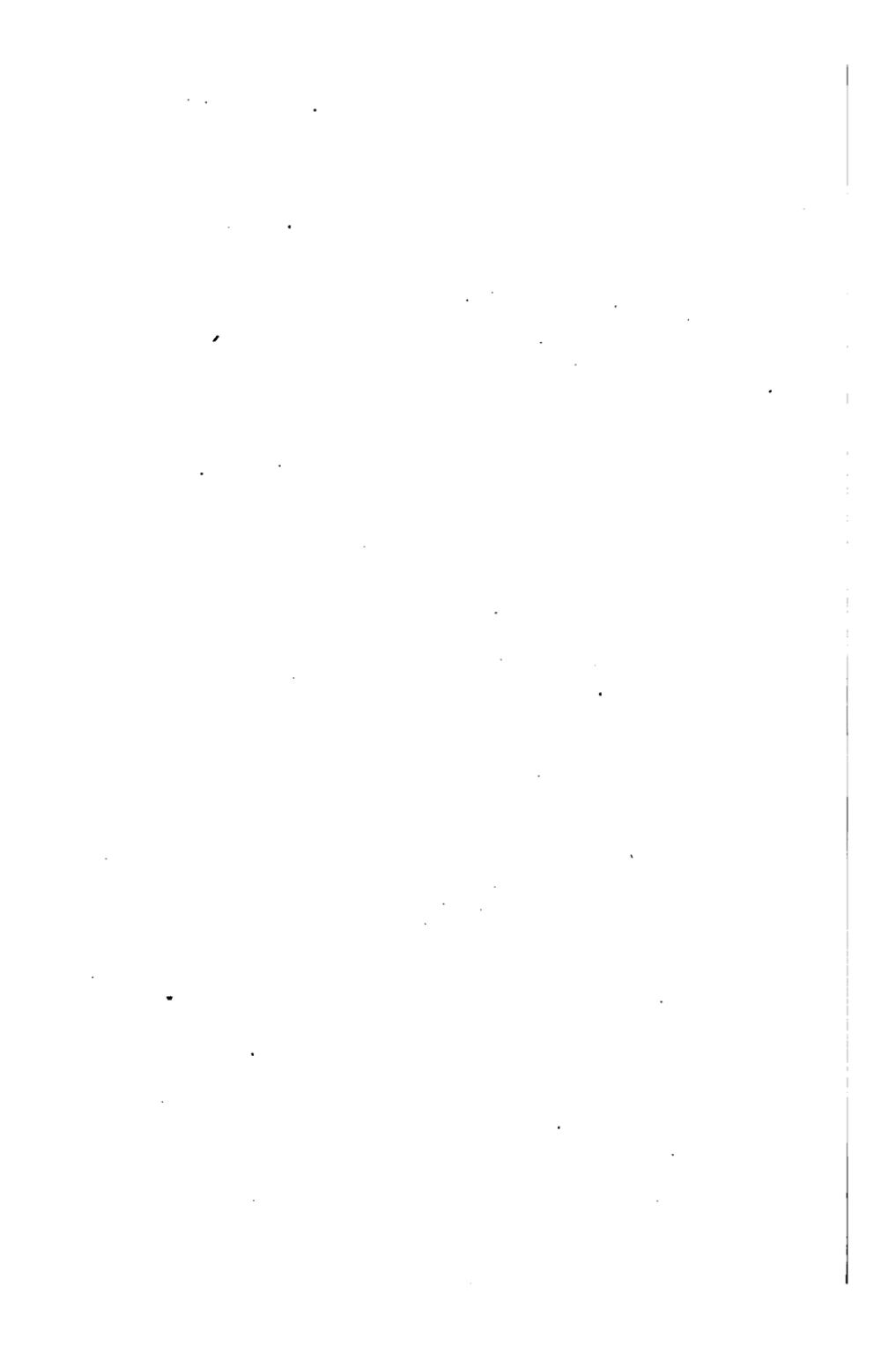
Has this discussion a practical bearing? I can go to twenty universities in the world, and find young men asserting that one thing is just as divine as another. Wrong is as natural as right, and whatever is natural is divine. The moral intuitions of which the ethical teachers say so much are only one part of nature; the worst passions are another part; and what gives one portion of nature authority over another? The bad man is brought forth by the Supreme Powers, and the good man is; and, to a consistent materialism, the one is just as divine as the other. If I go to Tyndall and Hückel, they say that the one is no more responsible than the other, and that the will is never free. How are we to justify any thing like clearness of thought in ethical philosophy, unless we can justify these fundamental beliefs which materialism itself takes for granted, but with which it plays fast and loose? These perceptions of primitive axioms are something not depending on any thing outside of us, but are original capacities of the constitution of the soul, and would have been the same, no matter what our experience had been. When a doctrine works badly, I hold that it is scientifically discredited as out of harmony with the nature of things; and this doctrine that the fundamental beliefs are useless, or uncertain sources of knowledge, works disastrously in the long range. I do not mention these evil effects of denying self-evident truths as proof that our necessary beliefs are authoritative; but I use these effects to illustrate the fact that there are practical issues involved of the most

transcendent consequence in the justification of fundamental truth. All we can say concerning conscience is undermined for some, by a certain philosophy of hereditary descent, which asserts that even the moral perceptions of self-evident ethical truth are solely the result of habit, and might have been different had our ancestors had a different environment. The intuitions represent no outward reality. We may as well, in the fog of our philosophy, when we know but very little, follow impulse, and forget entirely all that is said on this topic of the self-evident intellectual and moral truths.

22. The necessary beliefs, or perceptions of self-evident truths, therefore, are a part of the original revelation given to the soul by its Author, in the very plan according to which it exists and acts.

23. As such, the necessary beliefs of the intellect and conscience are the supreme and final tests of truth, or the unassailable guaranty of all mathematical and ethical axioms.

24. An adequate defence of fundamental truth, therefore, is made by the establishment of a proper definition of life. [Applause.]



IV.

DARWIN'S THEORY OF PANGENESIS.

THE NINETY-FOURTH LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, DEC. 31.

Partout où se manifeste le mouvement physiologique par lequel l'organisation commence, un principe spirituel est immédiatement présent. — LOTZE: *Psychologie*, ed. Penjon.

It is strictly and philosophically true in nature and reason, that there is no such thing as chance. — SAMUEL CLARKE.

IV.

DARWIN'S THEORY OF PANGENESIS.

PRELUDE ON CURRENT EVENTS.

AN ancient wall around the city of Göttingen has been converted into a broad and lofty embankment, and crowned with lime-trees; and under them runs a wide, smooth walk, on which the professors and students of that university city are often found pacing to and fro. There has been established lately in Great Britain a magazine called "The Nineteenth Century;" and it has signalized its entrance upon the field of periodical literature by what it calls a modern symposium, or published interchange of views among men of opposing schools in physical and religious science, on the topic of the immortality of the soul. So thoroughly permeated are the discussions of many English theologians with tremor in the presence of the passing fashions of thought in the British materialistic philosophical school, that I shall venture to ask you, in considering what the English symposium has said, to place that gathering of learned men face to face with their German peers. Let a

new symposium be called on these walks of Göttingen, under the lime-trees.

Of course we must invite to the assembly the ten men prominent in the English symposium: Mr. R. H. Hutton, Professor Huxley, Lord Blachford, the Hon. Roden Noel, Lord Selborne, Canon Barry, Mr. W. R. Greg, the Rev. Baldwin Brown, Dr. W. G. Ward, and Mr. Frederick Harrison.

Let us invite out of the theological faculties of benighted Germany, Professor Schöberlein from Göttingen University, an accomplished and tested teacher of systematic theology. He has had a high position in the faculty at Göttingen for almost a quarter of a century, and probably, therefore, must teach mediæval views. From just beyond this wall of Göttingen, on which the nightingales sing, invite out of the brown mansion yonder, among the orchards, Hermann Lotze. Let us take also, from the same city and university, the renowned defender of the doctrine of the atonement, Reitschl, whose recent book on the Vicarious Sacrifice any one must study who wishes to be abreast of modern thought on that theme. Then from Halle let us invite Julius Müller and Köstlin and Ulrici. The first of these three is often called the ablest of living theologians; and the last, as you know, is the editor of the "Zeitschrift für Philosophie," the foremost philosophical magazine in the world. Let us take from Leipzig Kahnis and Luthardt, and especially Delitzsch, who has written a work on Biblical Psychology, a topic running close to the theme of the English

symposium. From Berlin let us invite a scholar who is often called the ablest German theologian, and who in 1873 was a delegate to the Evangelical Alliance at New York, Professor Dorner, a man so far behind the times as to be trusted yet in the leading university of the world to represent the foremost chair of a department hallowed by the great names of Schliermacher, Trendelenburg, and Neander.

These twenty men, ten British and ten German, are pacing up and down on the Göttingen walks; and we inexpert people listen. Frederick Harrison, an English essayist and positivist, speaks first. This is his language: —

“ My original propositions may be stated thus: —

“ 1. Philosophy as a whole—I do not say specially biological science — has established a functional relation to exist between every fact of thinking, willing, or feeling, on the one side, and some molecular change in the body on the other side.

“ 2. This relation is simply one of correspondence between moral and physical facts, not one of assimilation. The moral fact does not become a physical fact, is not adequately explained by it, and must be mainly studied as a moral fact, by methods applicable to morals, — not as a physical fact, by methods applicable to physics.

“ 3. The correspondences specially discovered by biological science, between man's mind and his body, must always be kept in view. They are an indispensable, inseparable, but subordinate part of moral philosophy.

“4. We do not diminish the supreme place of the spiritual facts in life and in philosophy by admitting these spiritual facts to have a relation with molecular and organic facts in the human organism; provided that we never forget how small and dependent is the part which the study of the molecular and organic phenomena must play in moral and social science.

“5. Those whose minds have been trained in the modern philosophy of law cannot understand what is meant by sensation, thought, and energy existing without any basis of molecular change; and to talk to them of sensation, thought, and energy continuing in the absence of any molecules whatever, is precisely such a contradiction in terms as to suppose that civilization will continue in the absence of any men whatever.

“6. Yet man is so constituted, as a social being, that the energies which he puts out in life mould the minds, characters, and habits of his fellow-men; so that each man’s life is, *in effect*, indefinitely prolonged in human society. This is a phenomenon quite peculiar to man and to human society, and of course depends on there being men in active association with each other.

“7. Lastly, as a corollary, it may be useful to retain the words ‘soul’ and ‘future life’ for their associations; provided we make it clear that we mean by soul the combined faculties of the *living* organism, and by future life the subjective effect of each man’s objective life on the actual lives of his fellow-men.”

(*Nineteenth Century.*)

Translating into the ordinary speech of mortals this first outburst of wisdom, we find it to mean that there can be no existence of the soul apart from the body. Science has proved that there is a molecular tremor connected with all thought, emotion, and choice ; and if death is really our total disembodiment, then, for a man who holds that there must be a tremor of some form of matter connected with choice, thought, and emotion, there is no proof of immortality. This essayist is probably of opinion that religious science teaches that death is not only an unfettering of the soul, but a real and total disembodiment of it in every sense. Posthumous influence is all the immortality in which he can believe.

Let now the German symposium speak. This mediæval teacher of systematic theology, Professor Schöberlein of Göttingen University, on his own field, his native heather, opens his lips ; and this is the first thing we hear from him. I give you exactly his language, out of a volume he published at Heidelberg in 1872, called "Die Geheimisse des Glaubens," a work of reputation as excellent as that of its author in German theology : "God has destined soul and body to exist in eternal unity with each other. There is a natural body, and there is a spiritual body. Bodilessness implies a hinderance in free self-reservation. The highest perfection of the future, no less than of the present life, calls for the corporeity of the soul." (See Professor LA CROIX's translation of Schöberlein, *Meth. Quar. Rev.*, October, 1877, p. 687.)

This essayist, Harrison, looks astounded. The nightingales on the Göttingen wall continue to sing. "The soul," says Schöberlein, "appropriates from the outer world the materials suitable for its body. The formation of the body is not a result of mere chemical affinities between different elements of matter, but it is a vital process; it proceeds from the animate principle. The soul assumes to itself such elements as adequately express its life and wants. It itself, and not chemical affinities, is the organizing principle." (*Ibid.*, p. 687.)

Look into the faces of Julius Müller and Dorner, and Delitzsch and Lotze, and especially into the countenance of Ulrici, and you find no marked signs of dissent. There is general agreement with what Professor Schöberlein says. Lotze for a quarter of a century has opposed the mechanical theory of life. Ulrici has defended more than once, in the name of biological science, the theory that the soul has an ethereal enswathment from which it is not separated at death.

To these scholars the separation of the soul from the flesh is its unfettering, but not its disembodiment.

Frederick Harrison seems to be smitten with a new idea. But he is of opinion that this is not Christianity. He speaks again: "For my part, I hold Christianity to be what is taught in average churches and chapels to the millions of professing Christians. It is a very serious fact when philosophical defenders of religion begin by repudiating that which is taught in average pulpits." (*Nineteenth Century.*)

He, therefore, would establish for philosophical science inside the range of theology, a rule that he would not admit in the range of philosophical science as connected with biology.

Am I to take every average physiological scribbler on the globe as authority in biology? In a field of investigation which was nowhere elaborately studied previously to 1860, am I to adopt the average views even of magazine-writers, infallible as the more brilliant periodicals claim to be? No: we are to look to experts in biology for our facts. And so, in our interpretation of the Scriptures, we are to look to experts. We are to take the agreement of rival experts in the field of theological science as supreme authority, just as we take the agreement of rival experts in the field of biological science as final assurance of accuracy. When Frederick Harrison accuses this learned group of Germans of not following the scientific method employed by physical research, Ulrici replies that for twenty-five years he has been teaching the applications of that method to the relations of religion and science, and that if we are to be sternly true to the law of cause and effect we must infer the existence of some substance in which our sense of identity inheres. Ulrici affirms that it is stern, exact inference from the surety of our persistent sense of identity, that there is something to which that sense belongs. There cannot be any seeing, unless there is something that sees. There cannot be feeling, unless there is something that feels. Now, we have a persistent sense of identity;

we have a percipience of identity, and there must be a perceiver of identity. As this percipience is constant, the perceiver must be a unit from year to year, although the body changes all its atoms every few years. If Ulriei and Schöberlein and Lotze, with the general assent of their compeers, do not seem sound to certain omniscient writers for quarterly reviews on our self-illumined New England shore, which has led the world in philosophy, and which needs no enlightenment from Halle, or Leipsic, or Göttingen, or Berlin; if Sir William Hamilton happens to have said, fifteen years before this new discussion came up, that such a theory is not very important,—we of course shall dismiss it without any attention to dates in connection with Sir William Hamilton's opinion, or with Ulrici's and Lotze's and Schöberlein's words here on the wall of Göttingen. But when we find five or six theological faculties teaching much the same view, we shall listen to Schöberlein when he says further :

“We must come to the standpoint of an *ideal realism*, which holds the middle path between a materialistic deification of nature on the one hand, and a spiritualistic contempt of it on the other. Precisely this is the standpoint of the Holy Scriptures. In every position we shall take, our conscious purpose will be, not to speculate without authority, but simply to educe into fuller expression that which appears to us as clearly involved in the Word of inspiration itself.

“In the inorganic world we find matter and po-

tency undistinguishable. Crystals, for example, are formed simply by the immediate action of the spirit. It is only in the plant that force rises to some sort of individuality. Here there is a vital unity which attracts to itself homogeneous elements, and thus gives to itself an outer form. Such force is *life*, and such form an *organism*. At the next higher stage force becomes animal life. Here the central life has sensation, and is able to bring its organism into different relations to the outer world. Such life, or force, we call *soul*: such a sensitive, movable, soul-subservient organism is a *body*.

“The body is rooted with all the fibres of its being in the soul. Nay, the soul, on its nature-side, bears already within itself the essence, the potentiality, of a body; and it needs only to draw to itself the proper elements from the outer world, in order that the germinally extant inner body actually posit itself as a crude outer body, even as the virtually extant tree, in the ungerminated seed, needs only to unfold its potency in order to become a real tree.

“The body appears, therefore, as an integral element of human nature, both in this state of probation, and in the future state of eternal perfection.

“Jesus spiritualized his inner man, his soul, in its unity of spirit and of nature. Thus, also, he laid the foundation for the transfiguration, the ideal spiritualization, of his body, inasmuch as the essence of the visible body is grounded in the soul. This process was an inner hidden one. The hidden reality shone forth only in occasional gleams,—in those

miracles of mastery over his body, and over nature, with which the Gospels abound. We emphasize simply the *identity* of the risen with the buried body. The essence of his body remained the same: simply the mode of its existence was changed. A fleshly body has become a spiritual body, in which not only the free harmony of the soul with the inborn spirit stamps its harmony on the outer features, but, also, in which the material elements themselves are thoroughly permeated and exalted by the spirituality of the person."

Allow me to say that I was not aware that Schöberlein had taught these doctrines, when, in recent lectures here, I defended similar propositions. It was, I confess, not known to me, until I made close research in the track of purely theological discussion, that an accredited teacher like Schöberlein had made this use of Ulrici's and Lotze's biological positions. But we continue to look into the faces of our German symposium, and find no important dissonances there.

Schöberlein goes on, and illustrates, from all the facts of the life of our Lord, the power of the spiritual body over the physical. You are familiar with the line of thought. In Schöberlein's words, we are listening to suggestions precisely parallel to those presented here a few weeks ago (see *Boston Monday Lectures on Conscience*, pp. 43-84): "The peculiar traits of spiritual beauty which occasionally beam out from the persons of ripened believers are actual reflexes of the transfigured corporeity which lies

potentially within them. The natural fleshly body is simply the receptacle, the womb, in which the new body is invisibly generated and qualified, up to the hour when, the crude flesh falling away, it shall pass into the heavenly state, and spring forth into its full beauty and actuality."

The nightingale sings in the lime-trees on the Göttingen wall, and the curtain falls here; but another week we shall listen further to this symposium. At these accordant propositions from theological and biological teachers, Harrison begins to grow pale, and judges that it will be necessary for him to prove much more than he has done already, if he is to undermine the doctrine of immortality from the point of view of modern philosophy in its widest range.

THE LECTURE.

In the field of the battle of Waterloo there was a concealed ditch of Oheim, into which regiments in retreat, pushed on mercilessly by their companions and pursuers in the rear, were cast alive until the gap was full, and then the hosts who were escaping from death passed across the chasm in safety on the bridge of their dead predecessors. The ditch of Oheim, in the battle of Waterloo between the theistic and materialistic forms of the theory of evolution, is hereditary descent. How are we to fill up the chasm between life in the parent and life in the child, and use only the narrow mechanical theory of the origin of living tissues and of the soul? Say what you please of the subtler forms of German ma-

terialism, which I am not now discussing, the English forms are only other shapes of the old Lucretian atomic theory. At the last analysis, every mechanical theory of life is only a redressed ghost of Lucretius. When candidly unmasked, nearly all that has been given to us from England in support of materialism exhibits the faded features of the Lucretian hypothesis. Many and many a theory has fallen into the ditch of Oheim in this battle. Lucretius himself lies there at the bottom, a corpse. Fifty proud systems of materialistic philosophy lie above it; and now, writhing there on the very summit, under the hoofs of the retreating hosts, lies Darwin's theory of pangenesis. [Applause.]

What is Darwin's famous provisional hypothesis of pangenesis, and what are some of the replies to it? First, let me give you an outline of the theory in language containing no technical terms; next, let me state the theory in Darwin's own words; and, afterward, permit me to mention the more important of the objections which may be made to its fundamental propositions.

Suppose that we have here a single naked mass of homogeneous bioplasm [drawing a figure like that of an amœba upon the blackboard]. Let it be assumed that this piece of germinal matter is of one and the same substance in all its parts. It may be a living creature of one of the lowest types. If, now, this throbbing homogeneous bioplasm throws off from any part of its substance a portion of itself, the divided offspring will have qualities like those found in every

part of its parent. We know that it is a peculiarity of bioplasm to divide and subdivide itself. By a marvellous law of growth, the divided portions, when properly nourished, increase in size, and acquire all the qualities of their parent. A minute particle or gemmule thrown off from a single mass of homogeneous bioplasm grows according to the laws which belong to its parent, and becomes a mass like that from which it dropped off. Physical identity between the parent and the child is the groundwork of the explanation of the physical side of the law of heredity in sameness.

But now suppose that this animalcule, instead of being a single mass of bioplasm, consists of a more or less intricate structure. Let it be assumed that the upper and lower side differ, and that each of these has qualities distinct from those of the middle portion. If you are to account for the reproduction of that triplicate animal, you, according to Darwin's theory of pangenesis, must suppose a small mass of bioplasm thrown off from the lower section, another from the middle part, and another from the upper. Call the three portions of the animal 1, 2, and 3, and the gemmules thrown off from these parts respectively A, B, and C [illustrating on blackboard]. A will have the qualities of the portion of the animal from which it comes; that is, of 1. B will possess the qualities of 2, and C of 3.

You have, in this crucial case of hereditary descent, the law of identity of substance in parent and gemmule carried out in a threefold manner. There is

identity between 1 and A, 2 and B, and 3 and C. The nourishing of the three gemmules will result, therefore, not in changing A into B, or B into C, or the reverse, but in changing A into a second 1, B into a second 2, C into a second 3. When, now, this result has been accomplished, how shall we account for the arrangement of the newly developed parts in the proper manner? Every thing turns on their being collocated as 1, 2, and 3, and in no other order. Here comes into Darwin's theory, therefore, in spite of his theistic concessions as to the origin of the first germs, the great and vague materialistic word "affinity." When the gemmules have begun to be developed, "elective affinities" start up between them, and they arrange themselves in the order exhibited by the parts of the original animal. We understand none too well how a single gemmule develops itself into a form like its parent. The permutations that may be rung on three numbers are very considerable; but soon we shall see gemmules choosing the one right combination out of all permutations possible in billions and trillions of numbers. It is not absolutely inconceivable, however, that, when an animal has three separate parts, a gemmule from each part should, by its physical identity with the part from which it comes, inherit the property of developing into that part. But, on Darwin's implied theory of life, what causes these three parts to put themselves together in the proper way? Were either gemmule to forget its place, we should have a singular animal in the progress of that development. In the hurling

about of all these gemmules, under merely chemical and physical forces, what keeps these three particles from ever getting out of place? How much must be meant by elective affinities in Darwin's *hypothesis*? It can be called a *theory* only by courtesy.

Materialism assures us that a co-ordinating power independent of matter is a dream, a poetic idea! Huxley says that "a mass of living protoplasm is simply a molecular machine of great complexity, the *total* results of the working of which, or its vital phenomena, depend, on the one hand, on its construction, and, on the other, upon the energy supplied to it; and to speak of vitality as any thing but the name of a series of operations is as if one should talk of the horology of a clock." (*Encyc. Brit.*, art. "Biology.") Huxley is not a materialist, you say; but I must judge men by their definitions, and, although there are many schools of materialism, I affirm that this definition of Huxley's represents one of the most dangerous materialistic schools; for it assumes that the forces at work in the formation of the organism are merely chemical and mechanical. There is no life, no co-ordinating power, behind the tissues.

If, therefore, you build your theory of descent on the mechanical and chemical forces merely, you must rest the weight of your case on that word "affinity." There are elective affinities between the gemmules of the different parts of an organism; and the result of these affinities is to put the germinal points together in the right order, so that the resulting animal

shall be brought into existence right side up. Assuredly, your affinities must be very peculiar forces. Can they be simply chemical and mechanical, and yet adequate to their work? How is it that the gemmules seem to be possessed of an inflexible purpose of coming together in the right form, so that the animal shall be built up 1, 2, 3, and not 3, 2, 1? What if the first number should drop into the middle? Nothing but mechanical and chemical forces here, Huxley affirms! Darwin refuses in his theory of pangenesis to employ any other word than "affinity." To talk about other forces would be like talking of the horology of a clock!

If the affinities which bring the gemmules together in the right order are merely chemical, they are forces of a kind chemistry knows nothing of anywhere else. Here is a species of affinity that exists only in germinal matter. Even in that kind of matter, which to all human tests is chemically the same in many different kinds of germs, the plans of the affinities differ as endlessly as the types of life.

If, now, you will multiply the three parts of this small organism, thus far used as an illustration, by a number representing the multitudinous parts in the most highly organized animal, and apply the same law of descent, you have Darwin's theory of pangenesis. We have here [drawing a figure on the blackboard], let us suppose, the outlines of some highly complex form of organism; I care not what — the foot of a frog, or the palm of my hand. It is a mass of interlaced living tissues, and it is crossed in

every direction by forms differing from each other in outline, position, and activity. This colored biological chart (Plate III., *Boston Monday Lectures on Biology*) is only too inadequate an illustration of the complexity of the weaving performed by the bioplasts.

We have as many different parts in one of these tissues as there ever were in lace-work, and multitudinously more. We know that. But Darwin says, that, just as every part of a small and simple organism throws off a gemmule, so every part of a complex organism throws off its gemmule. That is, we have a gemmule from this corner [indicating on the blackboard], a gemmule from this, a gemmule from this, a gemmule from every one of these subdivided lines: a gemmule, in short, from every cell of this organism,—a complexity absolutely appalling to contemplate, for the number of gemmules must be absolutely inconceivable. But, although they go out into the circulating fluids of the organism, although in the vegetable world they permeate all the sap in your lily of the valley, they are nevertheless collected into the pollen of that flower. Every grain of that dust consists of aggregates of all these gemmules. Therefore, when a pollen-grain is subjected to the proper environment, the gemmules develop. They all have a number. There may be billions and trillions of them, but no particle forgets its place. The dance of the gemmules is a labyrinth, compared with which all the movements, seen and unseen, of all the visible and invisible stars

of heaven, is simplicity. But these points of matter, with nothing but chemical and physical forces behind them, as Haeckel and Huxley would say, or with nothing but *elective affinities* behind them, as Darwin would say, never make a mistake in a single step. They come together, they arrange themselves, they build a germ that will produce the lily of the valley. They co-ordinate themselves so as to constitute a seed which you cannot develop into any thing but a lily of the valley if the gemmules come from the lily, and into nothing but a lion or a man if the gemmules have come from these organisms.

Gemmules, it is supposed, will develop only in union with nascent cells like those from which they came. Here are three cells arranged in a series, and the second grows out of the first, and the third out of the second. When all these cells are developed, each drops out a gemmule. But the gemmule produced by the second cell will not develop itself unless it comes into union with a gemmule originated by the first cell and already started in its growth. The gemmule from the third cell must have a corresponding position in relation to the gemmule of the second, or it will not grow. Thus our elective affinities, the complexity of which has already astounded us, need to be raised to a yet more inconceivable height of complexity. We are bewildered under the demands of this theory. But the gemmules are not bewildered. Elective affinity keeps their poor heads steady. Each gemmule bethinks itself of its duties, takes its proper place in the swirl

of atoms and forces, and, with no co-ordinating power outside of itself, goes unerringly to its destination. There is your theory of pangenesis complete.

Let me now give you Darwin's own language:—

“ It is universally admitted that the cells or units of the body increase by self-division or proliferation, retaining the same nature, and that they ultimately become converted into the various tissues and substances of the body: But, besides this means of increase, I assume that the units throw off minute granules, which are dispersed throughout the whole system; that these, when supplied with proper nutriment, multiply by self-division, and are ultimately developed into units like those from which they were originally derived. These granules may be called gemmules. They are collected from all parts of the system to constitute the sexual elements, and their development in the next generation forms a new being; but they are likewise capable of transmission in a dormant state to future generations, and may then be developed. Their development depends on their union with other partially developed or nascent cells, which precede them in the regular course of growth. Gemmules are supposed to be thrown off by *every* unit or cell, not only during the adult state, but during *each* stage of development of every organism; but not necessarily during the continued existence of the same unit. Lastly, I assume that the gemmules in their dormant state have a mutual affinity for each other, leading to their aggregation into buds or into the sexual elements. *Hence it is not the*

reproductive organs or buds which generate new organisms, but the units of which each individual is composed. These assumptions constitute the provisional hypothesis which I have called pangenesis.” (*Animals and Plants under Domestication*, vol. ii., chap. x., American edition, pp. 369, 370.)

Every unit or cell, during each stage of the development of every organism, throws off its gemmules. What smooth language for the multitudinous numbers that must be thrown off! Each stage may mean every three minutes, for a new stage is reached in some rapidly developing plants in every three times sixty seconds.

“If one of the protozoa *be* formed, as it appears under the microscope, of a small mass of homogeneous gelatinous matter, a minute particle or gemmule thrown off from any part, and nourished under favorable circumstances, would reproduce the whole; but, if the upper and lower surfaces were to differ in texture from each other and from the central portion, then all three parts would have to throw off gemmules, which when aggregated by mutual *affinity* would form either buds or the sexual elements, and would ultimately be developed into a similar organism. Precisely the same view may be extended to one of the higher animals; although in this case many thousand gemmules must be thrown off from the various parts of the body at each stage of development; these gemmules being developed in union with pre-existing nascent cells in due order of succession.” (*Ibid*, p. 371.)

What are some of the replies to be made to Darwin's hypothesis of pangenesis?

1. The hypothetical gemmules may pass everywhere through the tissues of living organisms. They are inconceivably small.

Charles Darwin calls Lionel Beale "a great authority." (*Animals and Plants under Domestication*, vol. ii. p. 372.) I fear some Darwinians who read Beale are not candid enough to agree with their master in that opinion. But when Darwin cites Beale he is so frank as to say that this theory of pangenesis has been opposed most emphatically by Lionel Beale, and by Mivart, and by Professor Delphino of Florence, whose suggestions Darwin says he found very useful. This great authority, Lionel Beale, of whom we have heard here before to-day, admits that there may be masses of bioplasm too small to be seen with the highest powers of our present microscopes. The gemmules, however, on the theory of pangenesis, must be almost inconceivably smaller than those assumed particles of bioplasm, for every such particle in every stage of growth must throw off a gemmule; and these gemmules from all the bioplasmic points of the body must be collected in a little shifting dust which we call the pollen of a plant. In your palm and your oak there are millions of bioplasmic points; but, according to Darwin's theory, every unit, that is every cell, every bioplasmic point, in every stage of its growth, must throw off gemmules, and these must be collected together in the pollen. The gemmules must be inconceivably small, to be contained in so

receptacles. They cannot be absolutely innumerable, however, for if so they could not all be supported. Darwin himself says that "excessive numbers as the gemmules are believed to be derived, during a long course of descent, from each unit of each species, are supported or nourished by the soil and Plants under Domestication" (Darwin's *Origin of Species*, American edition, p. 396.) The point is to be wholly invisible. This is an important point, because it is very difficult to conceive of the imagination of the unscientific. You can see the soil and the plants, but you cannot trace the gemmules by any means. They are too small, too numerous, and too numerous to be seen.

by a graft would certainly be affected by the gemmules arising in the root and body of the stock. Such is not the case in many instances. Pips from a pear grafted on a quince-stock will not give rise to a hybrid between a pear and a quince. The stone of a peach grafted on a plum-stalk will not grow into a tree whose stalk bears plums while the extremities of the branches bear peaches.

The gemmules of the quince are thrown through the walls of the cells in the scion of the pear; they circulate in its sap, and we should suppose that they would produce a hybrid. But they do not. We know they circulate in the scion, if they are as small as they must be according to this theory. But we cannot trace them by the effects the theory requires them to produce if they are there. We find no effects: therefore we suppose they are not there.
[Applause.]

2. Pangenetic gemmules might pass everywhere. They can leave the body in the perspiration and the breath. There is no explanation in Mr. Darwin's theory for the presumed fact that they are all collected into buds, pollen, or any one similar receptacle. (See letter by LIONEL BEALE, in "Nature," May 11, 1871, p. 26.)

It is assumed that every cell of every tissue throws off a gemmule in every stage of its development. Now, the gemmules are so small that they may be breathed away; they may be perspired away. Your lily of the valley and your palm tossed in the winds may exude gemmules through all their pores. How

happens it that the representatives of no one cell are ever exuded or breathed away in any case? Gemmules may go anywhere. But in spite of all the tossings of the tissues, in spite of all the activities of the tissues in organisms that are constantly in motion, we find no one class of these gemmules lost. If, for instance, the gemmules that come from the lenses in the eye were to be perspired away; or if, as they circulate through the blood, they were to be breathed away, there would be no eye in the offspring. Now, how is it that there is nothing lost out of this marvellously complex mass of gemmules, when they are so inconceivably minute that hunting for a needle in a haymow is plain business compared with looking for a gemmule? This is the best form of the mechanical theory of life; and, in the name of theories as wild as this, some of us are asked to give up our belief in the immortality of the soul.

3. The hypothesis makes no distinction between a unit of matter and the unit of force in a living organism.

The individual type of life, or co-ordinating power in a germ or organism, I call the unit of force in that germ or organism. A single, naked, bioplasmic mass is the unit of matter. Cells are not the true units of matter in an organism. If the gemmules are formed by the breaking-off of minute masses from the units of matter, or naked bioplasts, these will not arrange themselves unless the unit of force or co-ordinating power of life is behind them.

It is vastly important, I think, to make a distinc-

tion between the unit of matter and the unit of force in a living organism. The unit of matter, at the last analysis we can reach in unbraiding the living tissues, is the structureless naked bioplast. But we know that behind the throbbing, weaving bioplasts, there is a unit of force, co-ordinating their motion. As the plan on which they weave preserves its unity in all stages of development of the animal, we conclude that the unit of force behind them preserves its unity. Take as many points as you please, therefore, of these units of matter, and you cannot arrange them unless you have your co-ordinating power behind them ; and, therefore, you gain nothing by your theory of elective affinities.

4. The hypothesis of pangenesis involves several untenable subsidiary hypotheses.

Professor Delphino, the justice of whose attack is largely admitted by Darwin, points out eight subordinate hypotheses which are required by the theory, and that several of them are not tenable. (See *Scientific Opinion*, Sept. 29, 1869, p. 366, and Professor ST. GEORGE MIVART, *Genesis of Species*, chap. x.)

The gemmules must have the power, in certain cases, of producing monstrosities ; that is, your elective affinities must be capable of being thrown out of their grooves occasionally.

The theory does not account for the fact that sometimes certain gemmules, although nourished like other gemmules, do not develop. A generation passes, and the traits of the parents are not in it. In the third generation the traits of the grandparents may

re-appear. Why did the gemmules lie dormant so long?

The hypothesis does not explain the inherited effects of the use and disuse of particular organs. "A horse," says Darwin himself, "is trained to certain paces, and the colt inherits similar movements. Nothing in the whole circuit of physiology is more wonderful. How can the use or disuse of a particular limb or of the brain affect a small aggregate of reproductive cells in such a manner that the being developed from them inherits the characters of either one or both parents? Even an imperfect answer to this question would be satisfactory." (*Animals and Plants under Domestication*, vol. ii. chap. x., American edition, p. 367.)

5. The theory of pangenesis explains every thing by the elective affinities of gemmules for each other, but leaves these elective affinities themselves unexplained.

6. According to Darwin's own concessions, many facts in hereditary descent are wholly inexplicable by his hypothesis; and his theory, "from presenting so many vulnerable points, is always in jeopardy."

7. The hypothesis is rejected by the foremost authorities in the microscopical investigation of living tissues.

8. The theory is not needed, as all the facts it is used to explain are accounted for by defining life as the power which co-ordinates the movements of germinal matter; and by assuming, what all the facts prove, that this power is transmitted in hereditary descent. [Applause.]

V.

DARWIN ON THE ORIGIN OF CONSCIENCE.

THE NINETY-FIFTH LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, JAN. 7.

I am striving hard to establish the sovereignty and self-existent excellence of the Moral Law in popular argument, and to slay the Utility swine. — EMERSON, 1829.

Est igitur hæc, judices, non scripta, sed nata lex, quam non didicimus, accepimus, legimus, verum ex natura ipsa arripiimus, hausimus, expressimus; ad quam non docti, sed facti, non instituti, sed imbuti sumus. — CICERO: *Oratio pro Milone*.

V.

DARWIN ON THE ORIGIN OF CONSCIENCE.

PRELUDE ON CURRENT EVENTS.

TWENTY learned men, ten English and ten German, assembled as a modern symposium, are walking up and down on the wall of Göttingen. Listening to their discussions, we find it impossible to understand their references to the complex whole of man's nature, unless we adopt Luther's division of the human being into three parts, body, soul, and spirit. We have been accustomed to speak of man as body and soul only, and to make no distinction between soul and spirit. We have used a twofold, but Delitzsch and Schöberlein employ a threefold, division of man's nature. When we recollect, however, the Biblical language, we find that Luther had warrant for saying, as Delitzsch on the wall of Göttingen quotes him, that the Scripture divides man into three parts: "God sanctify you through and through, that thus your whole *spirit, soul, and body* may be preserved blameless." Luther, in his exposition of the Magnificat for the year 1521, says that

Moses made a tabernacle with three distinct compartments. The first was called *sanctum sanctorum*, within which dwelt God, and there was a divine light therein; the second was *sanctum*, within which stood a candlestick with seven lamps; the third was called *atrium*, the court, and it was under the open heaven in the light of the sun. In the same figure a Christian man is depicted. His spirit is *sanctum sanctorum*, God's dwelling-place. His soul is *sanctum*: there are seven lights; that is, all kinds of understanding, discrimination, knowledge, and perception of bodily visible things. His body is *atrium*, which is manifest to every man, that it may be seen what he does and how he lives. Thus taught St. Augustine also, and many an accredited Biblical scholar before Luther.

This Delitzsch who is speaking is a professor at Leipsic University, and has written a renowned work on Biblical Psychology. From beginning to end of it he introduces as authority nothing but the Scriptures, and he adopts this threefold division. By the spirit is meant the conscience, or that portion of human nature in which there is a light not of us, although in us. We have spoken of the conscience as containing something which is not of us, and we might have used the word spirit in the same sense. The soul is the link between spirit and body, and contains all the physical powers except the conscience. That triple division of man is Schöberlein's also; but it would matter very little whether it were Schöberlein's or Delitzsch's, if it were not Biblical.

Ulrici, and many others of his school, who are given to the investigation of man from the light of merely natural science, adopt this threefold division as the outcome of their research from the point of view of mere reason. In previous listening to Ulrici and to Lotze, we have heard the former speak of a body of a physical sort; then of a third somewhat, or ethereal enswathment of the spirit, a spiritual body; and, lastly, of spirit itself. Thus the threefold division of man is adopted not only by the biological, but by the theological teachers: by the former in the name of exact research under the microscope and scalpel, and by the latter in the name of a careful dissection of Scriptural texts. It is a sign of the times here on the walls of Göttingen, when our Delitzsch, who has given himself to exegetical study, reaches through Biblical proof-texts precisely the same idea of the threefold division of man at which Ulrici has arrived by the methods of mere reason.

The English symposium has been accustomed to a narrow view. Frederick Harrison does not believe that there is in man any spiritual activity not connected with changes in the matter of his present physical body. He cannot imagine it possible that there is in man a soul having the power of existence apart from molecular change. Professor Huxley, although he will not assert in definite terms as much as Harrison has done, holds, nevertheless, that we are absolutely sure only of the existence in ourselves of two sets of phenomena, one physical, and the other

mental or moral. He suspects that the physical may be shown to be antecedent to the moral, and that, as antecedents, they are properly to be regarded as the cause of the moral. At the last analysis, even Huxley is ready to attempt a physical explanation of moral phenomena. Harrison objects to that. He thinks the physical side is the unimportant one in man, if either side is unimportant; but Huxley thinks the physical side the important one. They put rival emphasis on these different sides of the lower half of man, and do not appear to understand how different the outlook is the moment we rise to the German point of view, and make man to consist of three things instead of two.

Here we have three wheels,—a large one, a smaller within the first, and a smallest within the second. Suppose that they touch each other by cogs. Of course, if they all mash into each other, when you roll the inner wheel you will roll the second, and in that act you will roll the outer. In the reverse direction, you may roll the outer, and you will roll the second, and so the inner wheel. Delitzsch and Schöberlein and their schools think of man as spirit, soul, and body. The spirit is the innermost thing in the holy of holies. The soul is something midway between spirit and body; nevertheless it is subject to influences from both the soul and the body. Influences can go from the outside to the innermost of man, and from the innermost to the outermost. When a man is filled with lofty moral emotion, we find visible effects produced in his countenance.

This is a perfectly demonstrable result, coming from the activity of what the Germans call the spirit within the man. The inner wheel can move the wheel into which it mashes, and that can move the outer. It is very evident that the two inner wheels may be taken out from the outermost wheel, and yet continue their action and interaction. If the second wheel had the power of assuming to itself an envelope, or outer wheel, it might in another state of existence do so, and the fundamental plan of the wheels not be changed at all. We are more and more drawn by German biological and theological research to this threefold division of man as explaining the union between spirit and matter. We are led to the idea that there may be a third somewhat, or spiritual body affected from without, and affected also from within, and acquiring power from its contact with the spirit to clothe itself even when the present physical husk has been dropped off.

It becomes us here to depend on a wealth of exact citation, for we must not misrepresent by the breadth of a hair either the German or the English positions. Delitzsch speaks with a face full of radiance: "The power of life, that inconvenient and yet indispensable conception of exact investigation, is something exalted above the physical forces of attraction and repulsion: how much more, then, is the conscious soul, and still more the self-conscious spirit! Force, life, soul, spirit, form an ascending climax." (*Biblical Psychology*, T. & T. Clark's Foreign Theol. Lib., p. 93.) "Samuel, who came up out of Hades, had, therefore,

form and clothing as he had had in this world ; and when, on the Mount, two men approached Jesus, the glorified appearing likewise, and spoke with him, the disciples immediately recognized them as Moses and Elias. They appeared, therefore, in an external form corresponding to their temporal history, and were, therefore, unmistakable. But this external form is a spiritual one. By virtue of an internal power, spirits give themselves external human form when they make themselves visible to whom they will. The external appearance is the immaterial product of their spiritual nature." (*Ibid*, p. 100.)

"Are we at all to conclude thence, that the dead even before their resurrection, and without awaking of their bodies, are not able to appear again? The appearance of Moses and Samuel proves the contrary.

"We believe that the spirits of the departed are in themselves not without a phenomenal bodily form.

"The soul of the spirit, we say with Göschel, after the separation from its body is not wholly without a body : the inward body follows it.

"The soul is the *doxa* of the spirit, immaterial, but similarly formed to the body, which the spirit through it ensouls. It is, as the outside of the spirit, so the inside of the body, which in every change of its material condition maintains it in identity with itself." (*Ibid*, pp. 502-504.)

What am I reading? The book of an erratic? I am citing the renowned work entitled "A System of

Biblical Psychology," by Delitzsch, since 1867 professor of theology at Leipsic University; and this volume is translated in the very famous theological library issued by the Clarks of Edinburgh. It is a book crowned and recrowned through edition after edition.

Huxley and Harrison look into the faces of Ulrici and Lotze, whom they recognize as men adequately informed concerning physical science, and are amazed that the broader German outlook leaves no opportunity for dissent, even from the side of physical research. Some of us who are not trained in this philosophy think that by this interpretation of nature and revelation the doctrine of the resurrection of the same body is imperilled. But Delitzsch speaks again, with the Scriptures open before him, and with reverent voice: "The restoration of the human body results when God the triune supplies to the soul from the then glorified world of nature, materials for the new formation of its body, similar to those of which its earthly body was formed, and with which, when the soul impresses upon them the form of its inner spiritual body, its spiritual nature may attain to full manifestation even in the external body." (*Ibid.* p. 537.)

Delitzsch cites Schöberlein, and looks into the face of the great Göttingen professor for assent to these propositions. They sound very strange, and we shall have them denied by Schöberlein in the name of theological research, if they do really come into conflict with the accredited doctrines of the resurrection.

But, instead of denying the position of Delitzsch, Schöberlein replies, with the Scriptures open before him, "The souls of the departed will be clothed with glorified bodies. There will be brought to the soul, out of the transfigured world, materials analogous to the substance of its previous body, and upon these materials the soul will then impress the traits of its germinate body, so as thus to attain to full objective expression. In the case of those still living at the second coming of Christ, the process will be that of a simple transformation. Thus, even as Christ arose with the buried body, so such persons will then appear in the 'same' body which was laid in the grave. And this identity holds of the whole essence of the body, both its primary features and form, and also its substance. *As to whether this identity of materials implies that of the chemical elements, or even the identity of the ultimate atoms,* is a question which loses all significance, so soon as we reflect that these elements and atoms themselves are in turn composed of invisible forces; and that, in order to become integral parts of an organism, they must be dissolved back into these forces, and then arise out of them under a new form." (See Professor LA CROIX, translation of Schöberlein, Meth. Quar. Rev., October, 1877, p. 698.)

Why, to these Germans matter is only visible force! The body itself, and all other substance that we call matter, are a revelation of Almighty God. All matter as surely as all finite mind originated in him. As the azure sky, in which we see nothing, throws out from itself both the cloud and the light-

ning, so the unseen universe gives rise to the visible universe. We have invisible electricity in the air; we have invisible moisture there. The sky puts forth a fiat, and there is a cloud. It puts forth another fiat, and there is in the cloud electricity. So I suppose Almighty God evolves the seen universe of matter and the unseen of finite force from himself. It is not my belief that every thing was created from nothing, nor do the authors of "The Unseen Universe," perhaps the most suggestive book lately published on these intricate themes, affirm that. My creed is the reverse of pantheistic. It is said that an eminent naturalist of orthodox opinions in religion has publicly proclaimed that this platform teaches pantheism. He might as well call Mr. Phillips an eminent pro-slavery orator. Scholars in this audience are amused by such a charge. Whoever asserts the Divine Transcendency above Nature side by side with the Divine Immanency in Nature, and maintains the Divine Personality, may emphasize, as Martineau and McCosh and a score of recent writers have done, the doctrine of the spiritual origin of force, and yet not fall into pantheism. If any naturalist does not know that fact, his blundering in philosophy is probably the result of his absorption in his own specialty. [Applause.]

We find, however, that these Germans are not to be frightened by the breadth of the Scriptural outlook. Our listening to Schüberlein ought to be intense after Delitzsch has expressed agreement with him; but we find Dorner and Julius Müller, and

Kähnis and Luthardt substantially agreeing with him. There is more than one hero in scholarship leaning with massive arm upon the discussions which have been put forward by Lotze and Schöberlein and Ulrici, on these overawing themes.

If it be suggested that in the glorified universe there will be a restoration of other beings beside man, what shall we say? We are not called on to say any thing in this German symposium, but Schöberlein is. I am anxious to have you push him to the wall if you can. I am willing you should ask him definitely whether he thinks any other part of the present world besides man's body will ever have a transfiguration in the next world. Schöberlein is not reluctant to speak even on that perplexing but majestic theme. "Christ, by the spiritualization of his body, as taken out of the bosom of nature, has already consecrated nature itself to an ultimate transfiguration. On the basis of this beginning, therefore, will the Holy Ghost bring forth out of the bosom of the perishing world a new world,—not another, but the same world in a transfigured form, even as the raised body of Christ was not another, but the same in a transfigured condition. And nature, as thus renewed, will exist under the anti-thesis of heaven and earth, a 'new heaven and a new earth.' And the whole circle of natural objects will also come forth from death as integral parts of the new eternal state of things."

Do you say this is not definite enough, and do you wish more perfect information concerning the trans-

figuring of forms of life not human? In a passage which I have before me, Schöberlein asserts as his view that the new heavens and the new earth will be such as Agassiz anticipated.

“As with nature in general, so with natural objects in particular. There will be nothing desert or waste; but the Divine breath will pervade all things. Vegetation will exist in ideal beauty. Greed and hostility will find no place in the animate realm; the wolf will ‘lie down with the lamb’ in unbroken peace. In general all primitive forms of existence will re-appear in ideal perfection. Man will enjoy nature through all of his senses. The paradise that existed before will be restored after redemption.

“We are sown in weakness, but we ‘rise in power.’ There will be no alternation of work and rest, of vigor and weariness; but we shall subsist in ever-full vigor and enthusiasm.

“Whereas in this life we consist of the three elements,—body, soul, and spirit,—which may even be separated from each other, in the heavenly life the body and soul will be so pervaded with spirit that the entire human being will present but one unitary spiritual life.

“When all is thus transfigured, then *pure beauty* will reign. Heaven is the true home of beauty. For the essence of beauty consists in this—that the life of the soul beams perfectly forth from the body, and that the body thereby sheds a halo of glory back upon the soul. *All true art is a groping after heavenly ideals, and all art-works are anticipations of future*

spiritual realities. But in the 'yon-side' each human being will be a living art-work, and the life of communion among the saints will be an eternal evolution of holy art-life.

"Wherever the soul may will to be, there it will be able to be. Hence the body will not be a prison, but, on the contrary, a *free* home, for the soul.

"The body will be the perfect servant of the soul: hence it will be capable of instantly following, and keeping pace with, all the outgoings of imagination and thought. The law of love, whereby we live *in* those on whom we fix our heart, will be perfectly reflected in the body. The indwelling of soul in soul will be also an indwelling of body in body. And in this each will find his due place—so that, even as the church of Christ here forms but one body with many members, thus also, hereafter saved humanity will form but *one* organic *body*, whereof we shall all be members, each in his place. And of this organic whole, the head, the focal point, the sun, will be Christ himself. As our souls will eternally live of his life, so our bodies will eternally shine in the radiance of his glorified body.

"Our bodies are not mere caducous husks, to be thrown off when the soul is ripe. But nature and the kingdom of God, the rational soul and the human body, belong normally and essentially together. When the one is transfigured, the other is transfigured. And when, at the goal of moral development, they are risen to integral unity, then they persist, through eternity, as intimately united as form and substance, light and color."

Frederick Harrison here has talked of the eternity of the tabor. Adopting the principles of the *Nirvana* of the Brahmins, he has affirmed that an eternity of conscious self-existence can be only torture. "A mystical and inane ecstasy," he says, "is an appropriate ideal for a paradise of negations, and this is the orthodox view; but it is not a high view." (*Nineteenth Century*, October, 1877.)

But Schöberlein, unabashed in the company of German learning, replies, "When the soul has reached its perfection in God it will need at once to enter upon a course of untrammelled holy activity, even as God, whose image it is, himself eternally 'works; ' and to this creaturely need of a field for work, the world of nature offers the requisite scope."

Our disputants having paced through the whole night, the dawn now begins to cast its radiance on the wall of Göttingen. Above the low German meadows and in the trench at the foot of the wall lies a tracery of morning vapor. The summit of the wall is in sunlight. The lark is rising out of the fields. Our spirits are carried up by its flight to the inquiry whether we will adopt a higher or a lower philosophy, that is, wideness or narrowness of outlook. This comes to be the final question between the English and the German learned men. All they in this group who will not use the higher and the wider outlook which divides man in a threefold way agree to take physically a position symbolizing their attitude spiritually. Frederick Harrison walks down into the trench under the fog. He is a positivist. He be-

lieves in what he can touch. The only immortality for him is posthumous influence. But his doubt results from his narrowness of outlook. Long ago those who sit half way up the slope leading to the wall from the trench have outgrown that narrowness. They do not as yet divide man in a threefold way, but think that there are body and soul in man, and so are delivered from that style of mental unrest into the mist of which even William Greg must dip, as he takes his position. He knows not what to believe. He is now in the vapor, and now in the sunlight. Professor Huxley must walk down too; and, although the vapor will not wreathe his forehead, it will cover his feet, for the positivist and the materialistic evolutionist do not stand far apart. But Lord Blachford, Lord Selborne, Mr. Hutton, Canon Barry, and all the rest of this English group, three of them only excepted, stand here on the summit of the wall, with Lotze and Schöberlein and Ulrici and the other German scholars. They believe that man is threefold; and their breadth of outlook delivers them from the obscuring power of the vapor which broods only over the trenches. The lark continues to sing. There comes falling through the ether a divine voice: Narrowness is the mother of disbelief. Obtain a broad outlook, would you agree with God in your philosophy, and be able to transmit God's own thought into life. [Applause.]

THE LECTURE.

It has been well said that the question as to the origin of conscience has the same relation to modern philosophical discussion of religious truths that Bœotia had to the geography of Greece. That province was the key to the whole land. It became, consequently, the very dancing-plot of Mars. We have had many a theory put to such straits in explaining the single syllable *ought*, as to assert with Bentham that, "if the use of the word is admissible at all, it ought to be banished from the vocabulary of morals." (*Deontology*, i. p. 32.) The distinction between the desirable and the dutiful is a fact, however. The desirable is merely the optional: the dutiful is the imperative. The most characteristic element in the latter can never be explained solely by the former. The theories which derive the dutiful from the desirable have, in all ages, had insuperable difficulties in discovering a basis for moral obligation. The upholders of utilitarianism have to this hour reached no real unanimity on this central point. Bentham went so far as to deny the existence of duty. "It is, in fact, very idle to talk about duties; the word itself has in it something disagreeable and repulsive." (*Ibid*, p. 10.) The angular, sharp, erratic Schopenhauer suggests that conscience is composed of five elements,—fear of man, superstition, prejudice, vanity, and custom. (*Grund Probleme der Ethik*, p. 196.) Even David Hume, however, could say that "those who have denied the reality of moral distinc-

tions are to be ranked among the disingenuous disputants; nor is it conceivable that any human creature could ever seriously believe that all characters and actions were alike entitled to the affection and regard of every one." (*Inquiry concerning the Principles of Morals*, Essays, vol. ii. p. 223.) Profit a man may disdain, but duty has a commanding presence. We can refuse to do our duty, but we are unable to deny its authority over us in right. *De jure*, conscience always rules, although *de facto* it may not. All languages recognize the distinction between profit and duty, the desirable and the dutiful, mere expediency and the right. These great phenomena in language must have a natural cause. They are facts. They are hard, unmistakable, enduring circumstances in human experience. The question as to the origin of conscience is not only a vastly more important one than the inquiry concerning the origin of species, but it is one that can be investigated by the scientific method almost as readily. I enter on the dancing-plot of Mars here for the first time. Many of you may have thought that I have evaded the topic of the origin of conscience. I postponed it, in order that I might bear the whole brunt of its onset, after discussing the moral sense in detail. Having shown what conscience is, I now, with some profit, I hope, may raise the question, How did it originate?

It is evident that Darwin's hypothesis of hereditary descent, or pangenesis, requires in the gemmules, innate powers or affinities that amount to

as great a mystery as what we call life. Even on his theory, however, conscience must have been involved in the original capacities of the first living matter out of which, according to Darwinism, all animal forms have been evolved. You may be an evolutionist of an extreme type,—I will not say of the extremest or materialistic sort,—and yet you may hold that conscience is in the constitution drawn up in the cabin of “The Mayflower” before the ship landed ; and I, for one, shall have no great quarrel with you, if that is the form of your evolutionistic philosophy. But Darwin has put forth a special theory of conscience. He has endeavored to show how the moral sense, as it exists in man, may have been developed exclusively from the faculties possessed by animals. He makes conscience only another name for the operation of the social instincts conjoined with the intellectual powers.

Whenever an instinct is not satisfied, a feeling of unrest arises. If, for instance, the desire for food is not satisfied, we are left in unrest. Every instinct has a pleasure connected with its gratification, and a pain in the absence of its proper food. Just so the social instincts have pain behind them when they are not gratified. Darwin’s central proposition in his discussion of the moral sense (*Descent of Man*, vol. i. chap. iii.) is, that he thinks it “in a high degree probable that any animal whatever, endowed with well-marked social instincts, would inevitably acquire a moral sense or conscience as soon as its intellectual powers had become as well developed, or nearly as

well developed, as in man." Thus Darwin derives conscience from the combined operation of the social instincts and of the intellectual faculties. He makes remorse of conscience to be only the feeling of dissatisfaction a man has when the social instincts are not satisfied. He would have us explain the feeling that we are to blame, by the fact that we are not satisfied in our social instincts.

What are some of the more important objections to Darwin's theory of the origin of conscience?

1. Darwin teaches that "man comes to feel, through habit, that it is best for him to obey his more persistent instincts." But in the same connection he affirms that "the wish for another man's property is perhaps as persistent a desire as any that can be named." (*Descent of Man*, American edition, vol. i. pp. 88, 89.) Two pages before the first of these sentences, I find the second one. The context shows that instinct and desire are used here as synonyms. Theft and robbery, therefore, if we are to be logical, are to be justified on the basis of Darwin's theory. To follow conscience is to obey our more persistent instincts; but the wish for another man's property is perhaps as persistent an instinct as any that can be named. As Professor Calderwood of Edinburgh University has said: "Neither a good morality nor a doctrine of personal obligation can rest on this basis." (*Handbook of Moral Philosophy*, p. 147.)

The strength of an instinct depends on two things, — the persistency of the desire it represents, and the vividness with which we recall the pains or pleas-

ures arising from the desire. Hunger, for instance, is an imperative desire; but, when satisfied, its pains cannot easily be recalled in memory. It has often been remarked, that our painful sensations are reproduced in imagination less easily than our pleasurable. Now, this desire for another man's property, Darwin affirms, has in unsurpassed fulness the first part of strength; namely, the persistence of the desire. It is, he says, "perhaps as persistent a desire as any that can be named." But there is another part of its strength, and that is the vividness with which we can recall the pains or pleasures arising from it. Darwin affirms, concerning that part of its power, only that "the satisfaction of actual possession is *generally* a weaker feeling than the desire of possession." He thus implicitly admits that sometimes it is not a weaker feeling than the desire. Well, then, if *sometimes* it is not a weaker feeling than the desire, of course both parts of the strength sometimes belong to this impulse. If, therefore, the most persistent and strong instinct *ought* to be followed, as Darwin says, then sometimes our desire for another man's property ought to be followed. Darwin explicitly teaches that man comes to feel, through acquired and perhaps inherited habit, that it is best for him to obey his most persistent instincts. "*The imperious word 'ought' seems merely to imply the consciousness of the existence of a persistent instinct.* We hardly use the word 'ought' in a metaphorical sense when we say hounds ought to hunt, pointers ought to point, and retrievers to retrieve their game." (*Ibid*, p. 88.)

Here, therefore, is an instructive example of a lack of metaphysical and philosophical training in a renowned naturalist. Again and again this fallacy has been pointed out. It is not brought forward here to-day for the first time. Many discussions have exhibited just this strange bewilderment in Darwin's reasoning. Undoubtedly this writer is an expert in observation. Darwin has a massive head in what the books call the observing faculties, but not a very massive one in the philosophical faculties. I am using for the brain only that outline chart which Professor Ferrier's latest researches seem to justify. Darwin's books, however, are the best map of his own spirit; perfectly honest, candid as the noon, a mass of facts which are a mine for this whole generation, and for all generations to come, within the field of biological research, and yet not remarkable for the philosophical traits prominent in the writings of a Hamilton, a Kant, or an Aristotle.

Read Von Hartmann's late criticisms on the True and the False in Darwinism. (*Journal of Speculative Philosophy*, October, 1877, and January, 1878.) Read Virchow's recent reply to Häckel: "Only ten years ago, when a skull was found, perhaps in peat or in lake dwellings, or in some old cave, it was believed that wonderful marks of a wild and quite undeveloped state were seen in it. Indeed, we were then scenting monkey air. But this has died out more and more. The old troglodytes, lake inhabitants, and peat people turn out to be quite a respectable society. They have heads of

such a size, that many a person living would feel happy to possess one like them. . . . On the whole, we must really acknowledge that all fossil type of a lower human development is absolutely wanting. Indeed, if we take the total of all fossil men that have been found hitherto, and compare them with what the present offers, then we can maintain with certainty, that, amongst the present generation, there is a much larger number of relatively low-type individuals than amongst the fossils hitherto known. . . . As a fact, we must positively acknowledge that there is always a sharp limit between man and the ape. *We cannot teach, we cannot designate it as a revelation of science, that man descends from the ape, or from any other animal.*" (*Nature*, Dec. 6, 1877, pp. 112, 113.)

2. If you will allow me to affirm that Darwin teaches, at the outset of his discussion of the moral sense, propositions that would undermine the whole doctrine of personal obligation, I shall have said enough to make you cautious in adopting that theory of the origin of conscience.

3. In Darwin's attempt to trace the development of conscience from purely animal instincts, ideas of morality drawn from other sources slip into the argument. (See this criticism developed in NEWMAN SMYTH's *Religious Feeling*, and in ST. GEORGE MIVART'S *Genesis of Species*, and in various other writers.)

The atmosphere in which he conducts his experiment is full of germs of the moral sense. It has been

well said that they who try to prove spontaneous generation to be a fact usually perform their experiments in an atmosphere saturated with the germs which they wish to develop.

Darwin calls to his aid, in explaining the origin of the moral sense, a great number of floating moral germs. I have singled out twelve of these, and hardly need do more than name them in his language:—

(1) "Highly developed mental faculties." That word *mental* is very vague. If by mind you mean the whole spiritual equipment of man, as you sometimes do, it includes moral perception; and so surreptitiously, or at least unobserved, comes in the very idea of which Darwin would explain the origin.

(2) "The feeling of dissatisfaction." That is another vague phrase. It might mean moral dissatisfaction.

(3) "The power of language."

(4) "The idea of the good of the community." A very vague phrase that never would pass without being challenged under the microscope of metaphysical research.

(5) "The power of public opinion."

(6) "Obedience to the wishes and judgments of the community."

(7) "Feelings of love and sympathy." These often mean much more than merely social instincts.

(8) "Power of self-command." Of course there inheres in the very idea of self-command the idea of a distinction between motives. A clear choice among motives involves moral perception of the dif-

ferent character of motives, as good and bad; and so, under that phrase, "power of self-command," may easily come in the very idea of which the origin is to be explained.

(9) "Appreciation of the justice of the judgments of his fellow-men." There Darwin has the great word "justice," but all languages recognize a distinction between the just and the merely expedient. A perception of what is just in motives is an act of conscience. Darwin allows this atmospheric germ to drift into his experiment. Appreciation of justice! Why, that is conscience, and that is the very thing you are about to develop here by spontaneous generation.

(10) "Appreciation of justice, independently of any pleasure or pain felt at the moment." All these phrases are Darwin's. This last is not a poor description of one of the fundamental activities of conscience. Justice cannot be perceived at all without the power of perceiving the difference between right and wrong; and to perceive that, without any regard to the pleasure or pain felt at the moment, is the key of what we call conscience.

(11) "Avoidance of the reprobation of the one or many gods" in whom the individual believes. The sense of the Divine comes to us from conscience; and that germ is more dangerous than any of the ten that have preceded it. But here comes one yet more dangerous.

(11) "The fear of Divine punishment."

Surely, if you will give me all these germs, if

you will let them drift into my bottle in which I am required to produce, by spontaneous generation, conscience, I shall have no trouble with that experiment. [Applause.]

These are phrases out of Darwin's famous chapter. If, by such an amount of carelessness in his experiment, you are not thrown into scientific unrest as to Darwin's theory concerning the origin of conscience, I shall say that you are accustomed to a loose application of the scientific method, worse than I have been taught, even under the mediæval and mossy instruction of Andover.

4. *What ancestors do not possess, offspring cannot inherit.*

5. *The moral sense, therefore, cannot be inherited from a non-moral source.*

From my point of view these two propositions are the most important in the whole range of investigation as to the origin of conscience. Our only safety in reasoning is to begin always with absolutely undeniable propositions, and then to make only such inferences from them as are axiomatically clear. I think these two propositions are clear; and from them may be made inferences that undermine the foundations of every merely derivative theory of the origin of the moral sense. Darwin's hypothesis assumes that the moral sense is inherited from a non-moral source. His scheme of thought, therefore, makes the stream rise higher than its fountain, or involves the assertion that there can be an event without a sufficient cause.

6. According to Darwin's theory, pain comes to conscience only when some persistent instinct is left unsatisfied, and therefore the essence of all conscientious action, is simply the pleasurable. In natures badly organized, the vicious is often demanded by the most persistent instincts. The vicious, therefore, in these natures, is the conscientious in Darwin's sense; but this reduces the theory to absurdity.

7. It follows from Darwin's definition, that the pleasurable, on the whole, is that which conscience justifies. Darwin's theory makes no adequate distinction between the pleasurable, which is always only the optional, and the dutiful, which is always the imperative; it does not explain the commanding force of the word "ought;" it does not account for the axiom, "*Fiat justitia ruat cælum*," let justice be done, though the heavens fall.

8. Darwin himself concedes that his chief source of doubt with respect to his own theory of conscience is that senseless customs, superstitions and tastes, such as the horror of the Hindoo for unclean food, ought, on his principle, to be transmitted, and they are not.

One rule of science is to look into the misty places, which a theory will not explain, for new light. Wherever there are unexplored remainders we are likely to find new truths. Now, Darwin confesses that this vast range of senseless customs, superstitions and tastes, is not under the law of inheritance, and ought to be if his theory is correct. What if a man has been made so much better than a clod, that

a good angel, stepping on him, leaves an imprint that is not easily washed out; and a bad angel, leaving a bad imprint there, soon finds that the plan of human nature has re-acted against the impression thus made, and that a sense of justice has wiped out, as with a sweeping billow, the track of his hoof, and left the shore clean as God made it? You would judge, in that case, that the shape of the shore had been determined by some other power than the impact either of good feet or of split hoofs. There is a plan in the sands. They are not sands; they are a soul. [Applause.]

VI.

UNLIKENESS IN ORGANISMS.

THE NINETY-SIXTH LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, JAN. 14.

Deum te igitur scito esse: siquidem Deus est, qui viget, qui sentit, qui meminit, qui providet, qui tam regit, et moderatur, et movet id corpus, cui præpositus est, quam hunc mundum ille princeps Deus: et ut mundum ex quâdam parte mortalem ipse Deus æternus, sic fragile corpus animus sempiternus movet.—
CICERO: *Somn. Scipionis.*

Meus agitat molem, et magno se corpore miscet. — VIRGIL:
Æn. vi. 727.

VI.

WHAT CAUSES UNLIKENESS IN ORGANISMS?

PRELUDE ON CURRENT EVENTS.

SHALL the nation pay its debts, or swindle its creditors? Congress meets this morning; and the chief question before it is national honesty or national fraud. Even if there were an international Congress, it would not have power to make ninety-two cents in silver equal to an hundred in gold, unless all the boards of trade of the commercial cities and every man who sells bullion in competition with coin were to agree also to make a fraction of a dollar equal to the whole. No one Congress, no one modern nation, can fix the relative value of silver and gold coins. What Congress ought to do is an important question, but a necessary previous inquiry is whether it can do any thing effective for the relief of the debtor class. A man who has honest debts has commonly been in need of paying them. Who has power to reverse the law of supply and demand? Unless we can repeal the multiplication-table, we cannot take the burden off the debtor class.

It must be admitted that there is some force in the popular cry that there ought not to be one kind of money for bondholders, and another for the masses. What is the reply to that insidious plea of demagogues?

The government promised to pay "in coin" the principal and interest of money lent to it in the war for the protection of the nation. Public explanations made by the government interpreted the phrase "in coin" as meaning "in gold." Of course "coin" could not mean coin of depreciated value, and worth only ninety cents on a dollar. The whole people, including the debtor class and the workingmen, authorized through their representatives the promise to pay in coin. The pledge of the nation was made, not only to the wealthy citizens, but to foreign capitalists, and in many cases to those of moderate means in the American population. The war was for the benefit of every class, including the poor widow, who, out of her hoard, gave a little to the purchase of government bonds, as well as the capitalist, whose assistance of the government involved no self-denial. The workingman who purchased government bonds in any degree was one of the persons to whom the public faith was plighted. The war, in which the borrowed money was spent, was for the benefit of every class between the Lakes and the Gulf and the two oceans. The expenditure was pre-eminently for the good of those who now call themselves the debtor class by eminence. If, therefore, we are to look upon the promise of the nation as a serious one

when made in the highest places, there is nothing short of this conclusion before us, namely, that to break the nation's pledge to pay its debts in coin of full value is national infamy. It is national gambling, national cheating, national robbery. It is deliberate national injustice, not only to the rich, but to the poor. [Applause.]

Why should the President veto the silver bill? Because it contains elements of cool, treacherous unfairness, not merely to the capitalists of Europe from whom we borrowed, not only to the wealthy citizens here who assisted us in our necessities, but also to a great mass of men of moderate means who have the government promises to pay in coin. Bondholders are not all capitalists. Many of them are persons of small incomes. In these days when so many other forms of investing money are unsafe, it will not do to let it be understood that government bonds mean less in fact than in promise.

If legislation in one country ascribes to gold and silver coins a relative value as legal tender, materially different from the relative value of gold and silver bullion, of course in that country such legislation will succeed only in compelling the acceptance of the over-valued metal in debts and contracts. The law will not change the commercial value of coins.

A level of values throughout the civilized nations must ultimately be reached under the natural law of supply and demand. In the country that has over-valued silver coins, there will be an excessive supply of them from other parts of the world, provided the

difference of their value and that of gold coins is eight or ten per cent, as it would be in the present case. There will, therefore, exist, in the country over-valuing silver, a surplus of silver over other coins. Thus depreciation will occur there in part, and appreciation will occur in the exporting country, and so a level will be produced.

Massachusetts Bay cannot agree with Liverpool harbor how high the tides shall rise. No admiral has power over the tides. It would not be possible for London, Paris, Berlin, St. Petersburg, New York, and Washington together to fix a firm standard of the relative value of gold and silver. The great tides in commerce depend on quite other forces than national legislation. We cannot prevent water or money from running down hill. There will be a level reached in the commercial atmosphere. Guyot says that the great art of constructing weather-maps is to notice how the air flows down a slope. At the same instant of actual time the height of the barometer is determined all across this continent. Thus it is known where the hills and valleys are in the atmospheric landscape, so to speak. Where the barometer is high, the air is heavy; the opposite condition exists where the barometer is low; and so a certain slope may be discovered in the atmosphere. Down that slope the wind will run. There will be a level produced, and so the course of storms can be predicted. Now, just that law prevails in the commercial atmosphere; this thing of mystery and storms and the lightnings of panics is all as explicable as our weath-

er, if only you remember the law that air and water and money must run down hill. If the air above Ohio and Indiana, if the air above that whole section of our country which has defended our inflated currency, were to pass a resolution that no currents shall flow down its slopes, the effect would be much the same as if America were to pass a law that no currents should flow down its slopes towards London and Berlin in the commercial atmosphere. [Applause.]

This matter is out of the power of Congress; but one thing is not out of the power of our national legislators. They can disgrace us. They can repudiate their promises, not as a whole, but ten per cent, or eight per cent, of them. They can refuse to pay in gold the principal and interest of government bonds. They have done so already. Lord Beaconsfield said once of his opponents that their chief business was blundering and plundering. What will be the effect, if Congressional repudiation succeeds?

Let the financial promises of the nation be dishonored, let ninety cents be made legal tender in place of a dollar in gold, and we shall find American bonds returned from Europe. Capitalists there would certainly refuse to take any more very suddenly. We know what the reputation of American banking is, on the whole. There are illustrious exceptions. But the saddest hour I had abroad was when I sat down on the steps of the Bank of England, after having twice lost money by American banking-houses, and wrote to my friends to send me

no more funds except through the Baring Brothers, or some English firm. Undoubtedly we have sound houses ; but let this silver bill pass, let foreign creditors be cheated by it, or put into such a position that they assuredly would think themselves cheated, and the effect on American credit will be of a painful kind, and perhaps prolonged. There is no sense in the boards of trade on the Atlantic coast, if they do not know where their interest lies in the matters of importation and exportation. But the Atlantic cities, which have most at stake, are substantially a unit against this silver bill. Your Boston Board of Trade has appealed to Congress against its passage, and at the same time has not been unmindful of the interest of the poor man. The Boston Board of Trade is willing to have all debts under ten dollars—under any small sum—paid in silver ; willing that silver shall be legal tender in small amounts ; and that takes off a burden from persons who are extremely poor, and diminishes the weight of the clamor concerning two kinds of money, one for the rich and another for the debtor class.

If the silver bill were to become a law, it would depreciate the value of the savings banks deposits of the poor. Who does not know that every man that has put money into a bank has expected, and has been led to expect by the action of the general government, that it would gradually appreciate in value ? We have had a terrific experience with an inflated currency in the form of paper, and yet we have little by little come out of it : such is the recuperative pow-

er of American commercial life. Now, on the heels of the disasters which have followed our inflated currency, and which in some senses have turned a great part of the country into a gambling-house, we are asked to inflate the currency again by agreeing that ninety-two cents in silver shall be worth a hundred in gold. Many of the evils which came to savings banks under the old inflation will come in this proposed new inflation. Every man has been watching the rise of the value of the paper currency. It now is almost ready to transform itself into gold. We shall resume the cash payment of paper promises soon, and do so in the hardest coin,—that which is the standard of the world. But it is very evident that if the silver bill were to pass, and the new inflation were to enter upon its course, every man who has made a contract, every man who has money out at interest, would be more or less defrauded.

It seems to be seriously imagined in certain quarters, that we can buy things cheaper if only we pass the silver bill, and make ninety-two cents equal to a hundred. But here is my friend Mr. Jones, who sells merchandise and groceries; and here I am. He sees me coming with a dollar that is worth ninety-two cents. What does he do? He raises the price of his groceries and his merchandise rather more than eight per cent, and when I reach his salesroom my advantage has evaporated. How is it that we do not see that the poor, the extremely indigent, who must pay high prices for food in parcels, are injured by all inflation in currency? Prices go up as money goes

down. In the long course we must pay what things are worth. It is by the merciless law of the survival of the fittest, after ages of experience, that gold retains its place in most modern nations as a monetary standard.

If you want two standards, as many do; if you think it essential to the progress of civilization that there should be a silver dollar as well as a gold dollar, let the nations agree. Have an international congress called; let Berlin and London and Paris unite with New York and Boston in determining that there shall be a double standard. Until you can rule the whole circuit of the atmosphere, do not think you can prevent the winds from flowing down the hollows. [Applause.]

THE LECTURE.

When the ice breaks up in the St. Lawrence in the spring, it does not move all at once, but is first honeycombed by the approach of the sun from the south. In the middle of the mighty river an opening appears where the currents are swiftest; and, little by little, they shoulder the masses of ice against the shore, piling them sometimes to the height of thirty and forty feet, with a noise of crushing, upon each other. At last the river carries to the ocean not a sheet of haughty solidified water, but of obedient aqueous fluid, reduced to pliability, forgetting that it ever was locked up by the winter, filling itself with mirrored reflections of earth and sky, and received into the sea at last as a part of the shoulder-

ing currents themselves. Just so the ice which has covered the surface of a large part of philosophy, the uncertainty as to the authority of self-evident truth, the frigid sheet of speculation on which has been built the assertion that conscience might have been another thing had our environment been different, is breaking up. It is being shot through and through by the returning vernal season of confidence in the plan of human nature. The central currents are already in sight; they begin to shoulder the edges of ice; occasionally a great roar is heard along the banks; the crushing of the blocks has begun; and by and by we shall have this philosophy of nescience and materialism, this doubt whether there are any ultimate grounds of certainty, this scepticism concerning the soul's necessary beliefs, melted, running with the great currents, received into the ocean, and casting up its gleaming and its exhalation into the face of the sky, with all the tides that God draws upward in the sea. [Applause.]

I am not prophesying in vain; for I hold in my hands the proof that the prophecy is being fulfilled. Stuart Mill and Dr. McCosh were accustomed to walk over this field of ice; and I must show you, before I advance to the physiological side of their problem, how unwilling Mill was to bear his weight on the central ice. He would walk near the shore with a very firm tread; but toward the end of his career, Mill, in his "Examination of Sir William Hamilton's Philosophy," said, "Whether the three so-called fundamental laws of thought are laws of our thoughts

by the native structure of the mind, or merely because we perceive them to be universally true of observed phenomena, I will not positively decide; but they are laws of our thoughts, now and invincibly so. They may or may not be capable of alteration by experience." (MILL'S *Admissions*. See McCOSH, *Fundamental Truth*, p. 75.) The mature Stuart Mill is very shy of that ice. He knew it was becoming thin. [Applause.]

Many think Mill asserts that all our fundamental beliefs are the results of our environment, and might have been different had our experience been different; but this is a great misapprehension. He says distinctly that the more important of them may or may not be capable of alteration by experience; and that is all he ever would say. If you will read the chapter in McCosh's "Defence of Fundamental Truth," entitled "Mr. Mill's Admissions," you will find twenty-four of these singular concessions, used as cimiters to cut down the haughtiness of the old and now largely outgrown associational philosophy.

But there was one point of the ice where the water came through. Mill would not weigh himself there. He would not trust the weight of a feather there. An unscholarly rationalistic newspaper has lately called on me to prove that Mill ever said that any necessary belief—as, for instance, that a thing cannot be and not be at the same time and in the same sense—may be primordial or original in human nature, and not the result of mere experience. I have been asked to give the page and line of Mill's writ-

ings where he uses this language. If anybody will open the American edition of Mill's "Examination of Sir William Hamilton's Philosophy," at the eighty-eighth page of the first volume, he will read, "That the same thing should at once be and not be,—that identically the same statement should be both true and false,—is not only inconceivable to us, but we cannot conceive that it could be made conceivable. We cannot attach sufficient meaning to the proposition, to be able to represent to ourselves the supposition of a different experience on this matter. We cannot therefore entertain the question, whether the incompatibility is in the original structure of our minds, or is only put there by our experience. The case is otherwise in all the other examples of inconceivability. Our incapacity of conceiving the same thing as A and not A, *may be primordial*; but our inability to conceive A without B is because A, by experience or teaching, has become inseparably associated with some mental representation which includes the negation of C. Thus all inconceivabilities may be reduced to inseparable association, combined with *original inconceivability* of a direct contradiction." (See also pp. 96, 111, 112; and MILL's *Logic*, book i. chap. vii. sect. 7.) Mill, in his later career, never would put his foot over this place where the ice of the St. Lawrence was so thin. But we have men in Boston who go in there for a bath. (Laughter.)

How shall we account for the unlikenesses of different organisms?

There are five theories for the explanation of the origin of the diversity of forms in animals and plants and all that has life. Turning from the metaphysical side of the question as to the origin of necessary beliefs, I now am to outline before you the principal theories on the physiological side of that problem in philosophy.

Hereditary descent has been explained by one or the other of these hypotheses: —

1. Chemical affinities;
2. Elective affinities;
3. Organic polarities;
4. Inherent movements in bioplasm;
5. Life, defined as the power which co-ordinates the movements of germinal matter.

We have, in the first place, the old Lucretian hypothesis, or atomic theory, that chemical affinities and physical forces explain the origin of form in organisms. In the name of Herbert Spencer himself, we may make short work with that style of materialism. Agassiz used to say that if only physical and chemical forces are at work in the organisms of plants and animals, we cannot account for the diversity of the types of growth. The chemical units are the same throughout the world. Oxygen is oxygen in the elm and in the palm, in the eagle and in the lion. Hydrogen, carbon, as ultimate atoms are the same throughout the world, and, for all we know, throughout the universe; and therefore there is no accounting for the diversity of form in organizations if physical forces are the only ones at work.

in them. The old Lucretian hypothesis is so far answered that it needs no longer to be considered in the conflict with materialism. It is not only crass and obsolescent, but among scholars it is obsolete. Let Herbert Spencer, however, be the policeman to give it a last arrest and imprisonment. In his "Biology," a book now outgrown by the progress of knowledge, Spencer wrote in 1866, "It cannot be in those proximate chemical compounds composing organic bodies, that specific polarity dwells. It cannot be that the atoms of albumen, or fibrine, or gelatine, or the hypothetical protein-substance, possess this power of aggregating into specific shapes," — and he gives the same reason upon which Agassiz insisted, — "for in such case there would be nothing to account for the unlikeness of different organisms. Millions of species of plants and animals, more or less contrasted in their structures, are all mainly built up of these complex atoms. But if the polarities of these atoms determined the forms of the organisms they composed, the occurrence of such endlessly varied forms would be inexplicable. Hence, what we may call the chemical units are clearly not the possessors of this property." (*Biology*, American edition, vol. i. p. 181.)

Many a man who calls himself a Spencerian, but is only a random student of his writings, or who has read him with his fingers more than with his eyes, and heard him with his elbows rather than with his ears, will defend on the street, and sometimes in the newspapers, that obsolescent form of materialism which even Spencer discards. I shall, from this

point on, take it for granted that the Lucretian hypothesis of materialism is dead.

Next we come to Darwin's theory of the elective affinities, or pangenesis. We have here a circle, let us suppose, and at its centre there is an atom of matter. According to Darwin's hypothesis, all the movements of matter in living organisms are to be accounted for by the elective affinities of minute particles called gemmules. Darwin does not in terms deny that the first germs were originated by the Divine Power, and it is not necessary for him to do that. Such affinities were put into that original germ, that every thing we call life has been developed out of the germ. We, therefore, must determine the qualities of that original living matter by Darwin's definition of elective affinities. Now, how many affinities must there be to account for the movements of a particle of matter to any and every point of a circle drawn around it? Why, just as many affinities as there are points in the circle! You have three hundred and sixty degrees in your circle, and there may be at least three hundred and sixty points measurable by the microscope in each degree. If the affinities of this gemmule account for all its movements, they must account for its movements in any direction, toward any part of that circle. In constructing the complex whole we call man, the gemmules must move to every part of a circle, up, down, forward, backward. Indeed, we must not only have affinities that will enable the atom to move in every direction inside a circle, but in every direction inside

a sphere. I have represented here only a plane surface; but, if there were another circle cutting thus at right angles [drawing a figure on the blackboard], the atom would need to have as many affinities as are represented by the radii of both the first and the second circle. Inside a sphere there must be as many affinities as there are points toward which that central particle will be called, or tend, in its weaving different physical tissues. Rather a complex set of affinities to belong to one gemmule; and yet Darwin's affinities must be thus complex, or they cannot account for the formation of what we see, and what we can touch. Gemmules must be moving in all directions, or they cannot build a hand or an eye. It is evident that as many dots as can be placed on the inside of a sphere by the aid of the best imagination will not be as numerous as the affinities which must belong to a gemmule, if you are to account for its motion by affinities alone.

But motion is not the only thing for which Darwin must account. He must explain the self-nourishment of each of these gemmules. They must have, therefore, as many affinities as there are different kinds of tissues in the organism to which they belong. One gemmule must take up the matter necessary to produce a cellular integument, and another that which is needed to produce a lens in the eye, and so on through the multitudinous forms of tissue. Thus, while we have need of a host of affinities to account for motion, there must be a second infinitude of affinities to account for self-nourishment.

But self-nourishment is not the only thing to be explained by elective affinities. Growth and formative power must be accounted for, and these in every different type of organism must be peculiar. Here, then, a third and fourth infinitude of affinities are needed.

But we must also account for reproduction. We must account for the co-ordination of tissue with tissue. So here are six kinds of incalculably complex labyrinths through which these affinities must wander without error or bewilderment. Draw circles around each of the other sets of affinities as you did around the first set, and you will find them just as complex. There must be sphere within sphere ; and every one of these affinities must be accounted for by the qualities possessed by the atoms of the original germ from which all life has descended. The affinities must work, wheel within wheel, endlessly ; and at last they must bring into existence a being that is a unit, always one thing from birth to death. Destroy the co-ordinating class of affinities, and the others would explain nothing. We reach here, therefore, the necessity of a co-ordinating power.

Professor Delphino of Florence, looking with his keen Italian eye upon Darwin's hypothesis of pangenesis, said, as many scholars have affirmed since, that it requires eight subsidiary hypotheses. But not eight only : eight hundred, rather, are required. There must be these different offices performed by every living thing, and the movement of the gemmules must be accounted for by affinities practically

infinite in number. Nevertheless, when we examine the necessities of Darwin's hypothesis of pangenesis, we must include among the affinities of the gemmules, a co-ordinating power as effective as what we call life. There must be some power that holds all these gemmules to one plan in their weaving. There is such a power. We know this. Darwin does not deny the existence of this co-ordinating power, but he calls it affinity. It is elective choice among these gemmules. Since, therefore, the existence of a co-ordinating power is conceded, let us fasten the fact in our memory. Darwin meets us at this co-ordinating power which governs the movements of germinal matter. We call it life: he calls it an elective affinity. I undertake to assert that there can be no clear statement of Darwin's hypothesis of pangenesis that does not include this co-ordinating power behind the movements of germinal matter. In the facts which it acknowledges, the second of the five theories, therefore, is not very unlike the fifth.

Turning to the third hypothesis, we find Herbert Spencer's famous doctrine of organic polarities. This is not Darwin's theory, by any means, although the latter is often confused with it. In his definitions Herbert Spencer is famous for his felicity of phrases, but not for felicity of thought. Organic polarity is the smooth phrase he uses to describe the cause of unlikeness in organisms. How does he himself define these two words?

Herbert Spencer is a candid man under the power of a tyrannical theory. His effort is to account for

every thing in life by matter and motion. In what we call vitality, he would explain every thing in terms of matter and force. When, however, he gives a definition of what he means by polarity, the facts of actual observation trouble him. He says that there is "an *innate* tendency in living particles to arrange themselves into the shape of the organism to which they belong For this property there is no fit term. If we accept the word 'polarity'" — I am quoting here a chapter entitled "Waste and Repair," in Spencer's *Biology* (American edition, pp. 180-183) — "as a name for the force by which inorganic units are aggregated into a form peculiar to them, we may apply this word to the analogous force displayed by organic units taking care, however, to restrict its meaning."

Hundreds of loose readers of Spencer think he means by "polarity" just what is meant by it in the range of physical research. He carefully restricts the meaning of the word, and closes his paragraph by this very significant language: "If we simply substitute the term 'polarity' for the circuitous expression, — *the power which certain units have of arranging themselves into a special form*, — we may, without assuming any thing more than is proved, use the term 'organic polarity,' or polarity of the organic units, to signify the *proximate* cause of the ability which organisms display of reproducing lost parts." Elsewhere he says that this same law is involved in hereditary descent. By organic polarity, therefore, he always means the *power that certain units have of*

arranging themselves into a special form. Well, that is substantially what we mean by *a co-ordinating power behind the movements of germinal matter!* Any man who will attend to definitions may easily ascertain that the power Herbert Spencer calls organic polarity must be, at the last analysis, substantially the same in effect as life, defined as the power which co-ordinates the movements of germinal matter. Come out upon this sheet of ice to the central currents, and you will find Herbert Spencer just as shy in the range of physiology, as Stuart Mill was in the range of metaphysics, of putting his foot on that central ice. The trouble is that some of you have wandered with Herbert Spencer only up and down the shores, looking at the bank-swallows' nests there full of snow.

Herbert Spencer himself more than hints that life must go before organization, although in spirit his theory has little regard for that truth. "It may be argued, that, on the hypothesis of evolution, life necessarily comes before organization. On this hypothesis, organic matter in a state of homogeneous aggregation must precede organic matter in a state of heterogeneous aggregation. But, since the passing from a structureless state to a structured state is itself a vital process, it follows that vital activity must have existed while there was yet no structure: structure could not else arise." (*Biology*, American edition, p. 167.)

The cause must go before the effect. Structured matter is structured by a cause. That cause goes

before the structure it produces. The structuring cause Spencer calls organic polarity. I call it life. As far as it makes use of facts, the third theory is therefore, at the last analysis, substantially the same as the fifth.

In the advance of microscopical investigation, we are finding that the great discoveries of the last thirty years concerning germinal matter have forced even upon materialistic biologists, since Spencer wrote his work, a new definition of life, and one approaching yet more closely to that which has been defended here. The latter, which may be called the established definition, I call the Aristotelian also, for it expresses Aristotle's idea that life is the cause of forms in organisms. I hold in my hands a recent work representing fresh discussion by French materialists. This volume has but just crossed the ocean. It is "Biology," by Dr. Charles Letourneau, a book well known in French, and translated now into English by MacCall, and constituting the second volume of Chapman and Hall's Library of Contemporary Science. Its discussion has a materialistic trend, as any one will see who opens at the strategic points. Always, when you take up a volume on biology, turn to the chapter on spontaneous generation. If any author believes in spontaneous generation, he is behind the times. Letourneau writes not without courage:—

“We are compelled to admit that the first living beings spontaneously organized themselves at the expense of mineral matter.

“The Darwinian doctrine, which results with such

evidence from paleontology, from embryology, from the well-hierarchized classification of the organisms, demands as its indispensable complement spontaneous formation, without germs, without parents, of the first examples of the living world.

"In the scientific domain, any logical and necessary deduction or induction ought to be admitted without contest, though it may shock old ideas and shatter old dogmas." (Page 301.)

Here is much more audacity than acuteness. In contradiction to Darwin, and against Tyndall, against Huxley, against all the cautious men in our modern physical research, this representative of Haeckel's school asserts spontaneous generation. He is to be pitied, but needs no reply here.

Nevertheless, when I turn to Letourneau's definition of life,—this is the second strategic point in any book on biology: feel the pulse at these two places in any volume on which you cannot spend more than twenty minutes,—I find Herbert Spencer's definition rejected in the name of late research:—

"The definition of H. Spencer, 'the continual agreement between interior and exterior relations,' has the fault of being too abstract, and of soaring so high above facts that it ceases to recall them. Besides, just by reason of its vague generality, it might also be applied to certain continuous chemical phenomena.

"It would be better to descend nearer to the earth, and to limit ourselves to giving a short summary of the principal vital facts which have been observed.

Doubtless, life depends upon a twofold movement of decomposition and renovation, simultaneous and continuous; but this movement produces itself in the midst of substances having a physical state, and most frequently a morphological state, quite peculiar to them. Finally, this movement brings into play diverse functions in relation with this morphological state of the living tissues, habitually composed of cells and fibres, endowed with special properties.

“Let us say, then, that life is a twofold movement of simultaneous and continual composition and decomposition, in the midst of plasmatic substances, or of figurate anatomical elements, which, under the influence of this indwelling movement, perform their functions in conformity to their structure.” (Page 34.)

I consider this late definition an important piece of philosophical news; and it is my business here, as an outlook committee, to put before you all such intelligence on which I can lay hands. This French materialistic writer gives a definition of life very much nearer the one which has been defended here than any in Darwin or Spencer. He calls life, substantially, an internal movement in bioplasm.

Letourneau’s definition is too long, and has not the usual French grace of expression; but three things are very noticeable in it. First, life is defined as a movement occurring at its earliest stage, “in the midst of plasmatic substances,” by which he means bioplasm. Thus he confines life, at its outset, to germinal matter. Spencer’s definition does not thus

limit life. Secondly, Letourneau speaks of movements in "figurate anatomical elements" as life, but elsewhere recognizes the fact that these elements obtain their figurate character by the agency of bioplasm. Lastly, Letourneau's definition points out the existence of a co-ordinating force. The figurate elements and plasmatic substances "perform their functions in conformity to their structure."

Thus, in the progress of discovery, the latest definitions of life approach more and more nearly to the Aristotelian. At the last analysis, this French materialistic definition, which calls life "a movement in plasmatic substances," implies all that has been asserted here, in the definition of life as the power which co-ordinates the movements of germinal matter. The movement in plasmatic substances must have a cause; and this we call life. Notice the gradual approach of science to that definition. The progress of microscopical research has forced materialism forward to this final breaking-up of the ice. The Lucretian theory is ice on which no man dares to stand. Darwin's elective affinities, and Spencer's organic polarities, lie at spots where men already hear the ice break. In Letourneau's definition, the swift central currents begin to pile the ice up on the shore. In Beale's, Lotze's, and Ulrici's, as well as Aristotle's, definition, you have the clear, open stream. [Applause.]

What bearing has this definition on the question as to the origin of conscience? How far has the definition a practical application in reference to the

authority of self-evident truth? See; there is a stack of books,— I might have piled it half as high as the roof of this Temple,— turning on the metaphysical inquiry whether conscience is really final authority, whether it results from the plan of our nature, or whether it might not have been different had our environment been different. On the physiological side yonder is another stack of books, that I might have piled half as high as the roof of this Temple, and turning, in large part, upon the same question.

1. *None of the five theories, except the fifth, accounts for man's sense of unity and identity.*

2. The theory of life, therefore, is the only one that covers all the facts in the case.

3. Lionel Beale does not hesitate to say that “the vital power of the highest form of bioplasm in nature is the living I.” (*Bioplasm*, p. 209, London, 1872.)

4. Even Spencer and Darwin are obliged to use the word “innate.”

5. Since a structuring power must exist before any thing can be structured, the plan of the body is innate in its co-ordinating or structuring power.

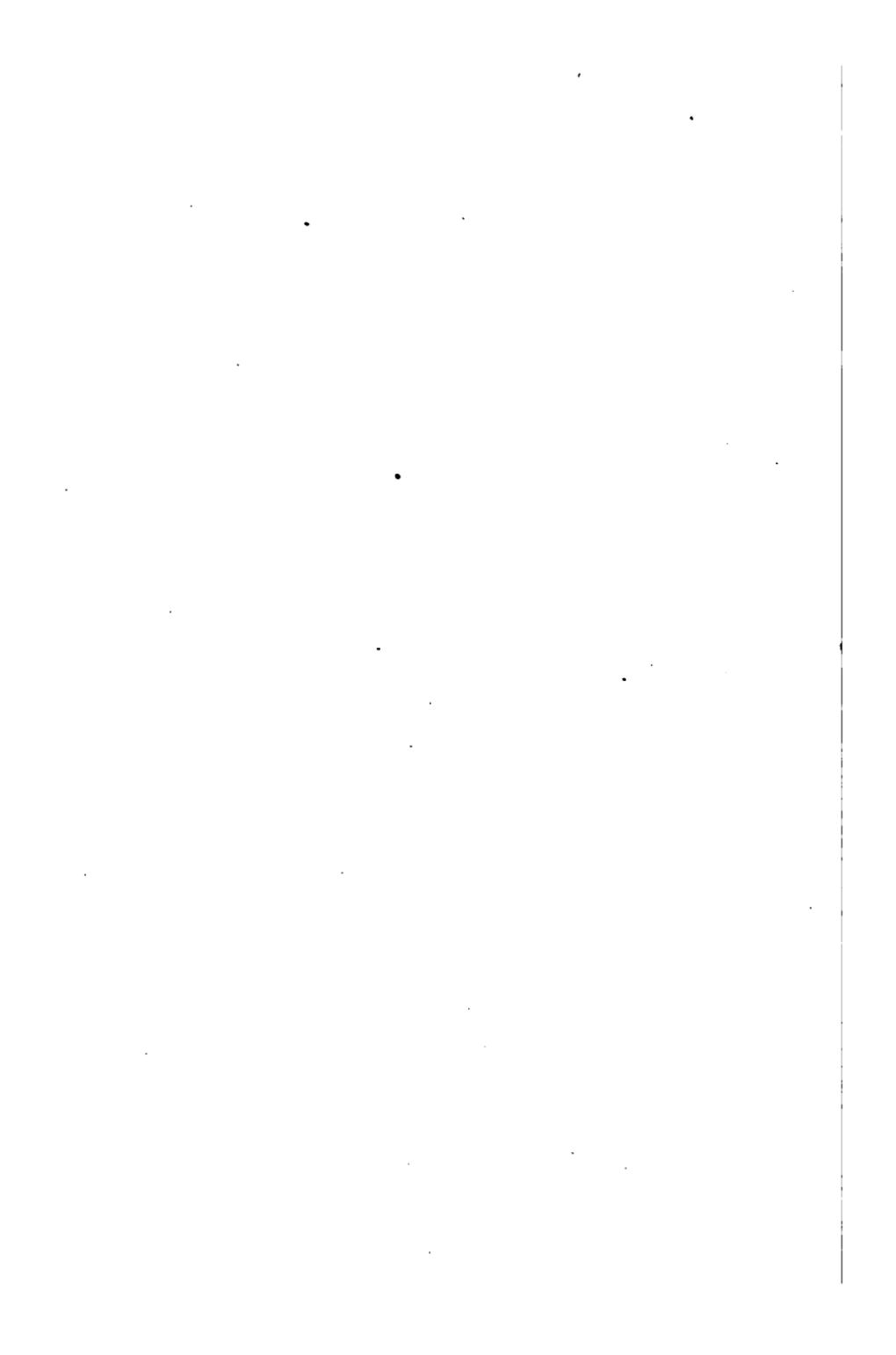
6. The plan of the soul, including its necessary beliefs and the conscience, is also.

7. The pretence that the conscience and the mathematical axioms are merely the inherited effects of environment and experience, and might have been different had experience been different, is thus answered.

8. There are, therefore, innate tendencies not derived from our environment; there are primary be-

iefs, intellectual and ethical and æsthetic, necessitated by the original plan of the soul.

The established definition of life as the power which co-ordinates the movements of germinal matter, proves that there was a plan in the cabin of the Mayflower before any sailors landed. In the original structure of the soul we find the origin of necessary beliefs, and a divine revelation of self-evident truths. Conscience is a primordial power. Our necessary beliefs that there is a distinction between a whole and a part, and right and wrong motives, would not have been different had our environment been different. The progress of research, in justifying more and more the Aristotelian definition of life, causes at last the icy congealments of the river of philosophical speculation to break up. We shall need, twenty-five years hence, I think, no discussion with those who do not recognize in fundamental truths authority entirely beyond experience. "Primordial," as Mill says; "original," as French materialism says; "fundamental," as McCosh says; "innate," as Spencer says, the primordial, original, fundamental, innate, self-evident truths will be victorious when once the course of scientific discussion has shouldered the heavy masses of its ice into the middle of the stream. The correct scholarship of the world is a clear river there already; and on it—the swift, central, enduring current—I advise you to launch your fortunes.
[Applause.]



VII.

LOTZE ON THE UNION OF SOUL AND BODY.

THE NINETY-SEVENTH LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, JAN. 21.

The unity of consciousness is indisputable, and to our mind inexplicable, so long as we do not go beyond the sphere of physical science.—RIBOT: *Heredity*.

God smote his hands together, and struck out thy soul as a spark,
Into the organized glory of things, from deeps of the dark.

Mrs. BROWNING: *Confessions*.

VII.

LOTZE ON THE UNION OF SOUL AND BODY.

PRELUDE ON CURRENT EVENTS.

THE illustrious Cornelia, mother of the Roman Gracchi, was assisted in the education of her sons by eminent Greeks. Tiberius Gracchus, as you remember, was present at the destruction of Carthage, in the year 146. Called to a position in Eastern Spain, he passed through Etruria, the old Roman province lying in the angle between the Tiber and the Mediterranean toward the north from Rome. He saw that the middle class of agriculturists had died out. Slaves in chains were performing manual labor on the great estates which are said by historians to have ruined Rome. The unemployed in the city on the Seven Hills were bravely and even tenderly remembered by Tiberius Gracchus, although they contained explosive elements, idle tramps and refuse, which Shakspeare, by the mouth of Coriolanus, has described as reek of the rotten fens. Pagan although he was, this Gracchus, educated in the Greek philosophy, resolved to do what he could

to create an industrious class of agriculturists of the middle rank. The lands on which he saw slaves in chains performing manual labor were public, not private, property. The senators were long misled by thinking the Roman Gracchi proposed to distribute private lands among the poor. They proposed only to redistribute the public lands. Gracchus sought to enforce, as we all recollect, a law by which no more than five hundred acres of the public land could belong to a single individual. If he had sons, two hundred and fifty acres for each son were added to the estate governed by the family. Of course these provisions drew down upon Gracchus the opposition of the wealthy class; and he was finally murdered, in his thirty-fifth year, during an election riot in Rome.

Had Tiberius Gracchus, his mother Cornelia, and Shakspeare, with all the ideas that are uttered through the mouth of Coriolanus, beheld the procession of five thousand workingmen in Boston last Saturday, they would have been profoundly interested and moved; but they would have proposed somewhat different measures than the workingmen themselves indorse. Nevertheless we must beware of thinking that every thing spouted for by deformers is nonsense. One of the things most needed in modern times is a machine for sifting deformers' proposals. Under universal suffrage it is important to listen to every outcry from men who are hungry.

If we sift the demands made upon the mayor by this Boston procession, we shall find that the con-

cluding ones, which were placed in the most emphatic position by the petitioners, are not very unwise. What did this crowd want Saturday? Ten measures of relief,—public work for the poor, governmental ascertainment of the number of unemployed, out-door relief for the needy, new public works, borrowing money for these purposes, repeal of the law disfranchising all who have received relief from the city within twelve months previous to election, repeal of the law requiring the payment of a poll-tax as a condition of voting, the prevention of prison labor from competition with honest labor, the abolition of the contract system. All that reads very much like petroleum communism, except the three opening propositions. There should be, and there is, a certain amount of city employment for any citizens of Boston who are among the unemployed, provided it is ascertained that they are greatly needy. There should be out-door relief; and such, within a certain range, is furnished in Boston and all our large municipalities. There should be governmental ascertainment of the number of the unemployed; and our noble Massachusetts Bureau of Industry is prosecuting very successful inquiries into the relations of capital and labor. But between these opening and the closing propositions are sandwiched pieces of wildness fit only for a mob. All experience is against these middle propositions, and they are to be denounced in the name of the interest of the poor. But here are two closing propositions which seem to me to deserve success, and that ought

to receive the attention of philanthropy,—governmental aid to land-ownership, and repayment of the loan by ten annual instalments to be secured by a lien on the land and utensils.

What I want is encouragement of land-ownership as a means of relief to the poor. Let us call back the Roman Gracchi to suggest a redistribution of the unemployed.

Men in want are accumulating in our cities. There are unemployed lands in the West, and there are successful experiments of agricultural colonization for the relief of the extremely poor.

We have all heard the famous remark, "Go West, young man!" These labor troubles, these stretches of real want, sometimes of starvation, among the unemployed, ought to secure from us a sharp attention to what experience has demonstrated as to the possibility of poor people getting a livelihood out of the government lands. Horace Greeley lies at rest in Greenwood Cemetery; and the last part of his life had in it, perhaps, no anxiety deeper than to contribute something toward the solution of the question, What shall be done for the unemployed? You remember that he made a plea, in the year 1869, for land to be distributed among colonies of the unemployed. He finally obtained a site between Denver and Cheyenne. Some twelve thousand acres were bought there from railroad companies, and two thousand from pre-emptors and squatters. One hundred thousand dollars were raised from six hundred and thirty persons. About one hundred and fifty dollars, and

five dollars for expenses, were required from each settler in the new town. Several hundred colonists went in May to this reservation. They were met by a late spring. They suffered much in the absence of houses; but in June they began to plant gardens. In nine months they had four hundred houses, twenty stores, mechanics in abundance, a weekly newspaper, and not a single gambling-establishment or liquor-saloon. [Applause.] Grace Greenwood visited that town in 1872, and called it a miracle of social advancement. The Greeley settlement is a very important and cheerful suggestion as to what may be done with some of the unemployed.

St. Louis has a colony at Evans, near this town of Greeley, and the place is full of promise. Chicago has a Colorado colony at Longmont, and it is said to flourish like a green bay-tree. Why is there not in the public domain at the West a Boston colony for the unemployed? Are St. Louis and Chicago and New York to succeed in imitating Gracchus, and is Boston to fail in doing so?

Of course we have any number of persons who are willing to furnish land to the unemployed, for a consideration. "Go to *my* colony! Settle near *my* railroad! Help raise the price of *my* land!" Everybody who has an axe to grind in the selling of lands for such colonies is likely to fleece the poor more or less. There has fallen upon all this scheme of colonizing the unemployed, great discredit on account of the land-sharks that have entered into competition with philanthropy. Our government itself is unable

always to withstand the rivalry of greed and fraud in this matter. Our national power has passed a pre-emption law, and a homestead bill, and a soldiers' bounty act, and a forest bill. To-day a hundred and sixty acres are given into a man's control if he will keep a quarter of the tract covered with woods. But the more fertile portions of our public lands have been sold to railway-proprietors and other speculators ; and the truth is, that one of the most difficult things in prosecuting now any enterprise like that of Mr. Greeley, and of St. Louis and Chicago, is the competition of land-sharks and railway-proprietors who are speculators. We have railroad kings who are real princes, but we also have railway kings who are thieves and sharks.

What, therefore, we need, is an organization of philanthropy, if this measure of land-ownership is to be pushed. We want, as Mr. Franklin W. Smith of this city has suggested in a very admirable pamphlet, such attention to this theme as may result in a combination of capital and philanthropy to secure the benefit of the public lands for the unemployed. Let us take out of the hands of greed and fraud the opportunity to defeat Gracchus. There is no agrarian law wanted. There is an organization of philanthropy needed, such that we can move suffering families, worthy and willing to go to colonies like those of St. Louis and Chicago and Anaheim and Vineland and Greeley. There are five specimen cases, and they are all encouraging ones. Many of the unemployed say they are willing to go, if aided with only a very little to go with.

Send out your detectives with the average tramps, let policemen in the disguise of comrades sleep where the tramps sleep, and this, I venture to say, will be the conversation in seven cases out of ten: "Do you know, Tom, that I have had my meals five years?" — "Yes! Have you worked any, James?" — "No." — "Do you intend to, James?" — "Not I." — "How do you get your living?" — "I ask for it here and there. I pick it up now and then without asking. Out in the country, in the dark, you know, I have been able to find chickens and a little honey! Sometimes it has been long between meals; but I have had my meals every day, with some irregularities, for five years, and I intend to have them for five years to come, and am never going to do any more work; not I." Perhaps he is half drunk. Able-bodied shiftlessness deserves the almshouse, and must sink, under the eternal laws of justice, until legal power compels it to earn its daily bread. "If any man will not work, neither shall he eat." [Applause.]

The better and the worse class of the poor are always with us, and we need a machine for sifting the worthy from the unworthy. Will you be taught by experience? You think I am appealing now to self-interest merely; but, if I understand my own object, I have no selfish motives in what I say. I own no railroad stock. I own no government bonds. I represent no church or society. I am not speaking for pay here. You will find it very hard to attack me on these points. [Applause.] There are points on which I can be attacked, but not on these.

We ought not to give out charity miscellaneous. We effect most with it when we put it for distribution into the hands of those who know the people they are aiding. The insufficient sifting-machine we possess already can and ought to be enlarged. There are employment-bureaus in young men's associations ; what is the trouble with them ? They have more work than they can do. There are philanthropists of the first water engaged in young men's Christian associations all over this land ; and you starve them on pinching salaries, when the work in which they are engaged in our great cities is almost as essential as that of the police. I undertake to say that the practice of your average merchant in Boston is wise when a beggar comes to him, and he sends him to his previous employers to bring a certificate. He sends him to the city missionary, who ought to know whether the man is a worthy character or unworthy. He sends him to an employment-bureau, and asks, " What is the reputation of this man ? " You need young men's Christian associations, Christian unions, employment bureaus, whatever you call them, willing to look into the cases of these unemployed young men, and to sift the worthy from the unworthy, and help the worthy. [Applause.] Let us increase the efficiency of the sifting machinery of which experience has already proved the value.

Five thousand men marching through this city, with a banner over them inscribed, " Hunger knows no law ! " A most infamous motto ! Hunger does know

a law. It will go to the almshouse if it does not work. But why does it not work? Chiefly, I think, because of lack of organization of the great philanthropic sentiment in the community. You do not know the difference between the poor that are unworthy, and the poor that are worthy; and you do not take any too much pains to find out. [Applause.] The organizations which have it for their business to ascertain the difference between those who are worthy, and those who are unworthy to receive aid, you allow to starve. You permit them to stagger through our great municipalities, jeered at not infrequently for their poverty. I do not want great houses for young men's Christian associations; I would have no man set his heart upon upholstery: but I affirm that these philanthropic agencies, which represent the union of all the churches, ought to be re-enforced and made able to help the young man in the attic, and the young woman, who may be succeeded in another generation by your daughter or granddaughter, and who, on the streets, goes to Gehenna because you have provided no sifting visitation to ascertain when a person really in need should be helped.

These are serious charges to make against modern civilization, but all through the world cities are growing with ominous rapidity. Agricultural labor does not require half the number of persons that it did before our agricultural machines came into use. In 1840 ten men were required on the farm where one is now needed. When people flock to cities, when the unemployed class is so large there, and when the churches

are so imperfectly performing their duty in sifting the worthy pauper class from the unworthy, strong charges are needed, vigorous speech is demanded, to awaken the churches to the support of the philanthropic institutions, such as the city missionary and the young men's Christian associations, and especially the young women's Christian associations, and all those organizations which have for their object the safe application of out-door relief.

This city is one of the most generous on the globe. Perhaps its philanthropic activities will compare favorably with those of any municipality on which the sun shines. Boston has great local pride in her charitable institutions, and in what they have done for the deaf, the mute, the blind, and the idiotic, and for every one that can come within the range of just demand upon benevolence. But we are New Englanders. We are proud of our inventiveness. Are we to be conquered by the growth of great cities?

Tiberius Gracchus in the air beckons modern cities on to the adoption of his measure of relief,—redistribution of the unemployed. He calls to us out of the unseen; and, with only pagan civilization behind him, puts us to shame for our indifference to those among whom belonged He who had not where to lay his head.

THE LECTURE.

When there comes together at noon-time in a busy city a great audience, expecting only dry, analytical discussions, it is complimented if the speaker begins with difficult matter. The first question which the

mystery of the arrival of a human being on this planet suggests is, When did its soul come into connection with its body? While we face that inquiry, we stand in the holy of holies of modern research; and I shall ask you to take, as a high priest, there, no American or English philosophy. It is my duty to present here what is supposed to be the best thought on the globe within the range of our fields of investigation, and not merely the best on this side the Straits of Dover.

Let me, therefore, outline rapidly before you Hermann Lotze's answer to the question, When does the soul unite with the body? The philosophy taught here is not always that of Lionel Beale, nor that of Lotze. I used Beale's facts very largely in biology; I used Lotze's philosophy more than any other. If you do not find every thing elsewhere that you find here, why, you may conclude—that I have not, either! But to-day, entering upon a very dangerous field of audacious speculation, I shall be representing Lotze's opinions rather than my own.

1. From the idea of matter, life and soul cannot be explained.
2. From the idea of spirit, all material properties may be deduced.
3. Choose the latter as the ultimate substance of all things, and we satisfy the desire for a similarity of character in all that exists.
4. Physical phenomena point to an underlying being to which they belong, but do not determine whether that being is material or immaterial.

5. Matter is a form clothing a supersensible reality, in itself similar to the soul.

6. When matter acts upon soul, or is acted upon by soul, it is not necessary to suppose that it acts as matter through the physical forces of its external sheath; but that the supersensible basis or core of matter directly acts upon and is acted upon by the other supersensible reality, the soul.

7. The will, Lotze believes, can produce movements in matter, not without cause, but without cause of the same kind,—that is, without a pre-existing movement whose energy is passed on into a new movement.

8. Consciousness is not a passive concomitant of the material changes in the nerves, as has recently been taught in Europe and America.

9. A difference of substratum transforms heat into magnetism, or electricity into heat.

10. If a physical energy is transmuted into a spiritual energy, it is absolutely necessary to suppose the presence of a peculiar subject, the soul, which by its peculiar nature produces this difference on the character of the phenomena.

11. Lotze's view, therefore, is in complete harmony with the doctrine of the correlation and transformation of forces.

12. The birth of the soul is not the result of the natural course of things, nor yet is it a creation out of nothing.

13. The substance of which it is made existed in the exhaustless substance of the Absolute.

14. The extended world of phenomena is not distinct from the domain of the absolute or the spiritual world, whence the soul comes, but is penetrated everywhere by it.

15. "That condition of the natural course of things in which the germ of a physiological organism is developed, is," says Lotze, "a condition which determines the substantial reason of the world to the production of a certain soul, *in the same way that an organic impression determines our soul to the production of a certain sensation.*"

(LOTZE, *Medicinische Psychologie*. See the translation of this work into French by M. Penjon, from a text so far revised and augmented by Lotze as to make the French better than the German edition as a final expression of Lotze's views. See also articles by Mr. BIXBY in "The Unitarian Review" for February and March, 1877, with summaries, a part of the language of which, under a new arrangement, has been employed in this analysis. For other similar statements, see UBERWEG, *History of Philosophy*, vol. ii. 312-341; and ERDMANN, *Grundriss der Geschichte der Philosophie*, vol. ii. chap. 347, 11-13.)

Suppose that we have here [making use of the blackboard] two differently arranged sets of particles of matter. The union between one of these masses and the others occur at this middle line. If we jar the particles on the left of that line, and the motion of the atoms crosses the line, the motion will not be the same on the right as on the left. Why not? Because the particles are not arranged there

as the particles are on the other side. Why is it important to notice that circumstance? We can transform heat into magnetism, or magnetism into heat. Both are only modes of motion, or a shiver of the ultimate particles of matter. You have here in the left-hand figure a peculiar organization of matter; and there, in the right-hand figure, another organization. You find that heat passing from this form of matter is transmuted into magnetism in that form. The difference between the shiver of the ultimate particles here, and the shiver into which it is transformed there, is accounted for by the different organization of the two sets of particles. Heat is not magnetism; and, when the former is transformed into the latter, the difference must have an adequate cause. The transformation is supposed to be due to the peculiar and different nature of the magnetic substratum. We know that this different substratum exists, for we see its effects. So, too, if a physical is transformed into a spiritual energy, it is undeniably necessary to assume the presence of a peculiar substratum, the soul, which produces this difference in the character of the phenomena. The latter difference is one of almost measureless breadth, and so must be the difference between the soul and matter.

Lotze does not teach that the motions of the ultimate particles in the nerves are transmuted into thought and choice and will. That would be materialism. Neither does he teach that there are two parallel sets of phenomena with no connection between them, and that the mystery of their union is

absolutely inscrutable. That would be Herbert Spencer's Nescience. Lotze assumes that matter and spirit have a common origin, and at the last analysis a common substratum. Matter to Lotze is visible force. In his view, it has all the ordinary qualities which we attribute to matter. It cannot move itself. Inertia is one of its inherent properties. Faraday was right when he said that inertia probably is the only true characteristic of matter. But, at the bottom of all matter, Lotze finds the absolute substance from which every thing in the universe proceeds. All things finite were created. From what? From nothing? No. Is matter an effluence of the Divine Mind? In one sense, yes: in one sense, no. God is not like matter, but matter is a product of the omnipotent will. The Divine Omnipresence transcends infinitely all matter and finite mind, but is immanent in both everywhere. Natural law is only the method of action of the will of Him who was, and is, and is to come. This is true of the laws of matter as well as of those of mind. Therefore his will underlies the laws of matter,—inertia, chemical attraction, cohesion, magnetic affinity,—as surely as it underlies the laws of the soul. He has given a substance to the soul: he has given a substance to matter. The two substances, we say, are utterly unlike. There is one thing in which they are common: they had the same origin. [Applause.]

If, therefore, as one of the propositions I have put before you declares, we are to explain how matter can have an influence on mind, and mind have an

influence on matter, perhaps we had better assume that the real core of matter is a supersensible reality. What does that long word mean? Something that cannot be reached by the senses. It is above our senses. There cannot be qualities in matter, unless there is something in which the qualities inhere. The soul too has its qualities, and these must have something in which they inhere. That something is immaterial. But what we call immaterial in the soul, and what we call supersensible in matter, may have at the bottom one quality. When, therefore, the soul acts upon matter, or matter upon soul, it may be that the supersensible element in the one and the immaterial in the other are brought into contact. The likeness of the supersensible and the immaterial accounts for the influence of the one upon the other. It is not necessary to suppose that chemical affinities, regarded simply as such, are transmuted into thought. Lotze rejects, in the name of the scientific method, every form of the mechanical theory that leaves us to conclude, that, when the body is dissolved, the soul is no more.

Must I venture an illustration to make these abstruse thoughts clear? There is a substratum in soul. There is a substratum in matter. When matter influences matter, the act is like that which occurs when two gloved hands meet and clasp. It is in one sense the gloves that clasp, and in another only the hands, the living forces beneath. But, when matter and a soul to which the Divine Will has given individuality influence each other, we have

a gloved hand, matter, meeting an ungloved hand,—the soul. You say that the glove presses on the ungloved hand. What you mean is that the hand in the glove presses the hand that is without a glove. [Applause.]

As I defend with few modifications Lotze's philosophy, there will, of course, be partisan attack on this lectureship from all quarters of the Spencerian sky. It means almost nothing, partisan praise or blame. Strong support and strong opposition will come. A few Spencerian critics assume that, as to what this platform has said of Spencer, it thunders all around the sky. It thunders only in a few portions of the hurt Spencerian and Darwinian sky, which is by no means the whole of the firmament. A little of that sky is sometimes found behind Orthodox mountain-ranges. [Applause.] But I shall prove to you that I intend to mislead nobody; I shall offer some evidence that no attack has been made that is more than a Chinese noise of gongs, instead of the real thunder from the sky; I shall prove to you my sincerity, at least—by asking you to read all the attacks! [Applause.] Study them carefully. We are here as students. Nobody will be more glad to have faults pointed out than I: nevertheless I must assert, in the name of candor and straightforwardness, that the attack which seems to be made the bell-wether for all others is the one that I am the most anxious to have you read. [Applause.] If that attack is the best that can be made, there is no great risk to be run in defending

a sound philosophy here. The writer finds an accusation of pantheism upon a citation which expressly asserts the Divine transcendency over all natural laws. As proof that it has been asserted here that "natural law and God are one," he quotes language which explicitly affirms that "He whom we dare not name transcends all natural laws;" that is, that God and natural law are not one. I have in my possession written proof that Agassiz made the same suggestion concerning parthenogenesis as that which was made here. Bishop Butler does not seem to this writer orthodox company. He has no words of respect for Beale or Ulrici or Lotze. He underrates very curiously the great value, in the conflict with materialism, of the recent advances of knowledge in the field of microscopical research concerning living tissues. He overlooks entirely the distinction drawn here between life, vitality, and soul, and then proceeds to make injurious inferences consistent with this oversight. Not one important error of biological fact is pointed out. He cites discussions of a quarter of a century ago, to justify the neglect of some of the most honored results of German philosophy, based on new investigations of the last twenty years. Even in this way of episode, however, and by side blows with the left hand, I am not about to defend myself; for I need make no reply to that attack, except this—read it. I could put before you evidence here that every word this lectureship has indorsed concerning the downfall of Huxley's *Bathybius* as a biological celebrity is true.

If any of you will study the original documents, you will be satisfied. Read Häckel's attempted defence of the Bathybius in a late number of the "American Popular Science Monthly," in which he admits that Huxley has changed his views, and that "from being a biological celebrity, Bathybius has tumbled down into the gloomy Hades of mythology." Even the crudely Spencerian New York "Nation" does not attempt to defend Bathybius. As to another point of partisan criticism, let me say that one of the foremost literary gentlemen in New England has authorized me, in writing, to assert that he knows the person who heard Thomas Carlyle make certain famous remarks cited here as to Darwin. [Applause.] Too much has been said in the "Popular Science Monthly" about the inaccuracy of the information obtained by Boston concerning this piece of literary history, but Boston and Ruskin happen to agree as to these words of Carlyle. If I were at liberty to mention the name of the literary gentleman who authorized me in his letter thus to use his knowledge, I should convince you at once that, on this point, there has been here no speaking at random.

Support from partisan sources means nothing to me; and attack from partisan sources, almost nothing. But when a man who has opposed all his life propositions which are dear to me, a man like the Plummer Professor of Harvard University, comes forward again and again, and indorses the general discussion here; when a man like the revered ex-

president of Harvard University, who has opposed all his life propositions very dear to most of us, indorses this lectureship; when the Dean of Canterbury, and "The London Quarterly Review," and "The Princeton Review," and "The Bibliotheca Sacra,"—I beg pardon, I am making a sad ado over nothing,—come forward, and support an experiment, a novelty,—I think that these, too, are signs of the times; and that, in the sky behind the sky, there is a little thunder also. [Applause.]

Lotze's doctrine is in perfect conformity with the modern theory of the conservation of force; and yet he never teaches that the motions of matter are transmuted into thought. Matter and spirit act upon each other through the supersensible reality which is in each. Lotze of course rejects what Häckel calls Monism, or the hypothesis that there is but one substance in the universe, with such properties that we can explain by it both matter and spirit. He distinguishes between the soul and the vital force. He affirms that the attempt to transform mental and moral science into a physical natural science is "a mere manner of speaking, signifying nothing; or else is equivalent to the pretence of understanding by the eyes, and seeing by the ears." He rejects the form of materialism defended by Professor Bain, and which asserts that matter is a double-faced somewhat, having a spiritual and physical side.

The distinction between the philosophy of Lotze and that of Häckel and Bain is a subject worthy of the attention of all scholars; for the subtler forms of

modern thought are crystallizing around Lotze and twenty other names which represent similar ranges of investigation, and are departing more and more from Bain and Häckel. Audiences do not often in this country give the ear you have given in Boston to this discussion; and, therefore, here in Boston this audience is calling attention to these themes for the whole country.

Häckel's Monism, which is one of the many forms of materialism, sinks soul in matter. Not so the subtler procedures of Lotze, not so Ulrici, not so Schöberlein. We have an accredited, I had almost said now firmly established, scheme of thought recognizing the laws contained in the fifteen propositions I have read to you, and asserting, in their name, the possible existence of the soul in separation from the body.

When does the soul originate? Lotze would not have you think of the immaterial world, the Unseen Holy beyond us, as separated from the visible universe. Souls, according to Lotze, do not come into the world from afar. They are not rained down out of some inaccessible region of the universe. They originate in God, who is not far from every one of us. He is omnipresent; and, wherever he is, there is the capability of creation.

Soul meets its organism whenever and wherever God calls that organism into existence. It is, according to Lotze, a being which from its characteristic nature is in immediate relation with the co-ordinating centres of the nervous organism and with what goes on in them.

When God creates germinal matter, to be used as the basis of the career of an individual human life, he, out of the omnipotent power of the universe, brings into existence what we call the gloved hand, or bioplasm; then he locks with it an immaterial or ungloved hand, which we call the soul. The two hands come into existence together. Lotze denies the theory of the pre-existence of the soul. But the ungloved hand does not depend for its existence on the gloved hand. We talk of matter as if it were a hand, and not a glove with a hand in it. So far as matter is inert, it is a glove only. This glove may be taken off. The supersensible reality at the core of it, the spirit, is God, and is indestructible. That supersensible reality, the glove taken off, may lock in with the other hand, and thus the Divine spirit and the soul, which the Spirit has created and upheld, the flesh dropped, the glove thrust away, exist forever locked together. [Applause.]

VIII.

THE TWOFOLD IDENTITY OF PARENT AND
OFFSPRING.

THE NINETY-EIGHTH LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, JAN. 28.

The facts of psychical heredity make it very highly probable that, could we reach the initial point of the individual life, we should there find an independent germ of personality which cannot be determined from without, inasmuch as it precedes all external determination.—WUNDT: *Menschen- und Thierseele*, ii. 416.

Man is all symmetrie,
Full of proportions, one limbe to another,
And all to all the world besides:
Each part may call the farthest, brother:
For head with foot hath private amitie,
And both with moons and tides.

GEOEGE HERBERT: *Man.*

VIII.

THE TWOFOLD IDENTITY OF PARENT AND OFFSPRING.

PRELUDE ON CURRENT EVENTS.

IN a letter to the historian Tacitus, the younger Pliny says that when the volcanic ashes and cinders which covered Pompeii were shooting upward in deluges from the throat of Vesuvius, and were falling on his own head in the dense, unnatural darkness, he thought that the end of the world had come, and that, very possibly, there were no gods. His uncle, the elder Pliny, was killed by a whiff of sulphur rising from a rift near a sailcloth on which he had lain down to rest on the shore of the bay of Naples. (PLINY, book vi., letters 16 and 20.) Many a college undergraduate, when passing through the early awakening of his intellectual life, has a storm of questions fall upon him like Vesuvian ashes and darkness ; and he very often concludes, with Pliny, that there are no gods, and that the end of the world has come. When you pray, next Thursday, for colleges, remember callow sceptics, honest young men, who can ask more questions than they can answer,

but who, in the heated darkness of the first eruption of intellectual freedom, conclude too early that all settled opinions are to be given up inside the domain of religious truth, that the final hour of established systems has at last struck, and that perhaps within the range of the firmament of faith there are no gods. The transitional state of culture very rarely understands itself to be transitional. Its lack of self-knowledge in this particular is a most subtle mischief. Had Pliny understood that on the Apennines the sun was shining, that the Mediterranean and the great deep were gleaming under an unobscured noon, he might have been at peace although encompassed with perils. But the most dangerous thing to do while any eruption of this sort is in progress is to catch breath from the sulphur-fumes of bad habits, to lie down on some sailcloth of indolence, and take a whiff from the nether regions. Occasionally the undergraduate does that, and suffers the fate of the elder Pliny. Sometimes galvanized corpses, that have inhaled gross and noxious volcanic vapors, strut through our professions several years; but we finally ascertain that they are dead men, and do not look to them for the initiation of reform. Books that have in them spiritual as well as intellectual power do not come from men who in college have followed the elder Pliny in breathing sulphur. [Applause.]

We must remember the wise proverb, however, that, when inquiry is shut out at the door, doubt comes in at the window. It is a necessary infelicity in our college courses, that they awaken intellectual

inquiry on all topics, and cannot fully satisfy it on any. There is not time enough in an undergraduate course to quench the intellectual thirst which the culture given there is intended to produce. One does not learn history in college, nor politics, nor law, nor medicine, so much as the right method of learning them ; and least of all is there time to settle the great problems in ethics and Christian apologetics. The young man must be taught, however, that he is free to make full inquiry ; and, unless it be insisted on that he shall make this for himself, the probability is that his mental unrest will be increased from some suspicion on his part that inquiry is thought by his instructors to be dangerous.

The only precaution I ask for is, that men will enter, not only upon free, but upon full inquiry ; not only upon special investigation, but upon all-sided investigations as to Christian apologetics. [Applause.]

In most of our colleges there is a tendency to push all professional learning upward into professional schools. We are crowding out of college courses much matter downward upon the preparatory schools ; and we are crowding matter upward into the theological, and legal, and medical institutions. Thus it is a result of the narrowness of the time in a four-years' course, that we have very many men who have been through college, who do not know anything more of theology than of law and medicine. It is not expected they should. It is not the business of a four-years' course to make a man a physician, a

lawyer, or a theologian. Fools dream that any man who has been through college can of course settle every problem inside the range of religious science, although you would not trust him a moment within the range of legal or medical science! [Applause.] So immense is the interest of philosophical and theological topics, however, that nearly every awakened mind presses into these fields; and yet, until a student has passed through a certain amount of special training, he is no more fit to give personal autocratic opinions as to philosophy and theology than concerning law and medicine. Look at religious truth scientifically before you undertake to give opinions on it *ex cathedra*. Master logic and the scientific method on the one hand, and the facts of your specialty on the other, before you attempt to apply the former to the latter. A professional training will be none too long or thorough to make you experts and authorities in medicine and law; nor will it be to make you such in theology.

Sometimes, in the late springs, the herds starve while waiting for the grass to grow. This hunger of waiting for the fat clover of culture through slow vernal seasons is the most melancholy circumstance of many college lives. Let an hour a day be given to feeding your soul's soul as best you may. In the end you will obtain most food by sharpening well the sickles with which you are to forage for it among the harvests of professional life. Faithfulness to all the college studies sends one into the brown wheat-fields at last with reaping-machines of the first order.

It is a common and just complaint, that professional training in our century is too often one-sided and narrow. Specialists all men must be who succeed, but they who succeed best will be specialists and more. Much of our education builds an arc, and not the whole circumference, of culture. Only whole wheels will roll. [Applause.] Wherever we leave out an arc in our culture, there is likely, as the wheel rolls, to be a halt some day. If a great university thinks it may be wholly secular, and teach nothing concerning religious truth, ignoring the loftiest faculties of man, then I say that university is not building circles of culture, but rockers. [Applause.] This age is a babe that goes in a cradle on wheels, and no longer in one on rockers. [Applause.]

Except the large culture of the higher powers of the soul, there is nothing we need more to insist upon as a remedy for scepticism than sound scholarship. If students do not care to compete with each other from motives of ambition, let them, from the love of usefulness, put themselves on the list of those who, by successful competition in college, have given a prophecy of their success in the competition of subsequent life. Macaulay said once that the general rule, beyond all doubt, was that the men who are first in the competition of the schools have been first in the competition of the world.

Who are some of the men now in public life in America whose college rank has been a prophecy of their success in life? Although valedictorians occa-

sionally ruin their health by study, or fail in life from lack of versatility of gifts, I undertake to affirm that the upper quarter of a college class usually furnishes more men of eminence and high usefulness than the lower three quarters taken together. The first twenty have generally furnished more men of distinction than the lower eighty in any one hundred of college graduates. I beg the pardon of every one here who, on account of ill-health, or from any other cause, may have dropped behind in the competitions of a university course. There are illustrious exceptions; and any who have fallen below the first quarter, no doubt, were geniuses who cannot be brilliant in every particular! I believe that Mr. Emerson and Mr. Hawthorne did not lead their classes in scholarship, although Mr. Emerson was class poet, and Hawthorne particularly requested his faculty that he might not receive a part at commencement. But of the graduates of Harvard between 1800 and 1850, who have obtained renown, how many ranked in the first quarter of the class to which they belonged? Four-fifths. Examining statistics which have recently been collected very painstakingly by Mr. Thwing, I find, that, among those now eminent in America, President Woolsey in 1820 took the first honors of his year. President Eliot in 1853 was one of the first scholars of his class. President Porter in 1831 had the third rank. President Seeley in 1853 had one of the very first places. President Smith of Dartmouth took in 1830 the third rank. President Barnard in 1828 had the sec-

ond rank. President Walker in 1814 was a leading scholar of his class. President Felton in 1827 was graduated with high distinction. President Hill in 1843 was the second scholar in his class at Cambridge. Professor Bowen, who leads now the philosophical department at Cambridge, was the first scholar of his class in 1833. Professor Peirce in 1824 excelled his classmates as much in the knowledge of mathematics as he does now his fellow-professors. Professor Dana in 1833 was the fourth scholar in his class. Leonard Bacon in 1820 was the fourth. Professor Tyler of Amherst College in 1830 was only one-half of one per cent behind that scholar who afterwards became known to the world as Professor Hackett, and whose rank at Amherst in 1830 was ninety-seven and one-half per cent for the whole course. It is well understood that there is no infallibility in college-marks. Who knows which was the better scholar, Tyler or Hackett? They were both excellent scholars, and have been very distinguished men. The little differences between the ranks are not insisted on in forming college estimates. Something, however, must be taken as the rule by which to rank men, if you appoint the parts according to the ranking list; and so such an apparent injustice may occur as here. The general rule stands, nevertheless, that the upper quarter furnishes as many distinguished men as the lower three quarters.

You say that these scholars are all professors and presidents, and were peculiarly influenced in after-

life by an academical position. Examine the lists of authors. Bancroft, Prescott, Palfrey, were all in the first quarter of their classes. Motley had an excellent rank. The poet Longfellow, at Bowdoin, in 1825, was among the first three or four of his class. It is notorious that the career of Edward Everett in college was as brilliant as it was outside in every thing connected with scholarship. Daniel Webster was probably the second scholar in his class at Dartmouth in 1801. Mr. Evarts was among the very highest at Yale in 1837. Rufus Choate is one of the three who in a hundred years have been graduated at Dartmouth with a perfect mark.

How do American colleges compare with other universities of the world? How many universities worthy of the name have we, with as many people as Great Britain? Look into our text-books, and where are the authorities to be found that are named in the foot-notes? Are they American? Seven out of ten of them are German. Scotch and English may add two per cent more. I think not more than one out of ten authorities quoted in our works of learning is American. But we are an hundred years old. It is more than two hundred years since Harvard University was founded. What was the spirit which filled the souls of those who planted learning in the rocky soil of New England? Cotton Mather spoke of Harvard College as "the university which has been to these plantations what Livy said Greece was to all the world, *Sal Gentium*, the salt of the nations; the river, without the streams whereof these regions

would have been mere unwatered places for the Devil." (*Magnalia*, vol. ii. p. 1.) The spirit which founded New-England colleges is needed to-day to bring them up abreast of the fearful non-academic competition which is bursting out all over the globe. Even German philosophy is divided now into two streams, — academic and non-academic. The professors must meet more and more the rivalry of men who have never been through college. The truth is, that, in America, liberally educated men are subject to such a non-academic rivalry that we need to say every now and then, very sympathetically, that a man is a man even if he has been through college. The difference between a fool who has been through college, and a fool who has not, is that the former usually knows that he is a fool, and the other does not. There is in this country no law for learning, except that it shall shine, and give itself position, whether it has a candlestick to stand in or not. President Woolsey says, "We have candles, and no candlesticks." There is great need here of inspiriting college life by the influences of home life and of non-academic competition, and by emphasizing the difference between first-class and second-class work.

We might do well to cultivate that rare kind of reverence which attaches to university learning in Germany. I rode once into the city of Jena, and was amazed to find under many windows little fixtures looking much like our lawyers' signs outside their offices, and bearing the names of students who once roomed in the apartments thus marked. Com-

mon-looking houses, with their stucco fronts, would be ornamented with three or four of these signs. Such a great scholar had his chambers here; such another, there. The people are proud of having roomed a student who acquires high position. The government in Prussia makes entrance upon any learned profession conditional upon the passing of a university examination or its equivalent. Bismarck says emphatically that the university in Germany exists for imperial purposes. No entrance upon a great profession there without such a thorough training as comes from a university course, or from its equivalent outside! What if university life had similar honor here?

It is often affirmed that the American Congress has deteriorated in general intellectual capacity in the last fifty years. The number of educated men in it is less than it has been. The preparation of college graduates for taking part in thorough discussion in our newspaper press is not as complete as it ought to be, and as it will be by and by when we have suffered enough from inferior newspapers. The second-rate sheets are maintained better than the first-rate. We have in this country no class of college graduates waiting to get into their professions, who can produce critical articles like the best of those known abroad in nations no larger than ours. There are several critical weekly journals in Germany and France, and at least half a dozen in Great Britain, usually in large part written by university graduates waiting to win their way into their profes-

sions, and better than any similar publication we have yet produced, not excepting even one. There are five or six great professions,—the law, medicine, the ministry, journalism, authorship, science, philosophy. Compare these, and regard them as peers. No one profession has a right to sneer at another. But we have not in this country, as yet, attained such a university life as to equip newspapers, which are our special pride, in such a manner that we can face without blushes the critical journals of the Old World. We have more newspapers than any other nation; and more poor ones. We have, it is said, more newspapers than all the rest of the planet. The American press excels the English in the collection, but not in the discussion, of news. In view of the multiplex mischief and shame resulting solely from the deficiencies of our culture, it is to be reverently whispered that the faculties of colleges are to be prayed for, as well as their students. [Applause.]

THE LECTURE.

The ceiling of the Sistine Chapel at Rome contains a picture by Michael Angelo, representing the creation of a soul. He had only these words to suggest the design of his painting: "Man became a living spirit." What would you have made, had your task been to produce a picture with this sentence as its only suggestion? Angelo shows us Adam as a perfect body, reclining upon a mountain slope, and possessing animal life merely. The Supreme Spirit, floating in ether full of brightness, draws near him

in human form. Of course the figure representing the Divine Being must be a failure, and perhaps blasphemy; but art says that, as a mere human form, it is one of the most matchless in the world. Some cherubs' faces that accompany it are exceedingly noble. This figure represents the creative Power. It extends its right arm, and Adam lifts up his left. His hand is lax; his whole body is flaccid; but from the Divine finger to his finger there passes an electric spark of the Divine likeness, and Adam becomes a living soul. A photograph of that supremely majestic work of Michael Angelo I keep on my study-wall, and I cannot live with it out of sight. Nevertheless, to me it is not the most perfect symbol of the method of the Divine action in the creation of a human spirit. Better than that picture to suggest the attitude of modern science, would be one far older, the tabernacle in the wilderness enswathed with a cloud full of light, and having at one part of its interior a holy flame. The cloud touching every part of the tabernacle is the emblem of the Divine Intelligence acting in all natural law. But this presence is manifested in some parts of that tabernacle, in a sense in which it is not in all parts. There is a conscience in man; there is in the human soul a capacity which does not exist in the immaterial portion of a brute creature. The cloud enswathes the slabs and the brass and the curtains of the tabernacle, as well as the holy of holies. There is no portion of the symbol that is not bathed in the cloud, and so there is no part of natural law that is not filled by the Divine

Omnipresence. In the conscience, however, and in the creation of the human spirit, the Divine Presence is manifested as it is not elsewhere. At these places a holy of holies exists, and in it is a holy fire. On this theme, as on so many others, the symbols of the tabernacle are inexhaustibly significant. The cherubim stand above that holy fire, and look down upon what lies beneath their wings, and do not understand it all. They know that this spot is the holy of holies, and that God is there; and probably ages hence, when such illumination shall have filled the world that our present science will seem to be darkness, the cherubim will yet fold their wings above the inmost shrine of the human conscience, and say, "Holy, holy, holy! We know that God is there." Mechanism is not the word that will be written on that casket an hundred years hence. It is not the word written there to-day under the eyes of the highest scholarship. [Applause.]

Instead of answering in the name of any authority, German, Scotch, English, or American, the question as to the origin of the soul, I am now to endeavor to obtain a reply from the established facts of biology. What do we understand of the process of the production of many lives from one? Stuart Mill asks us to make always a broad distinction between what we positively know, and what is yet in debate. Leaving out of my list of propositions every thing doubtful, I am now to collect and put before you only the facts as to which scholarship is agreed concerning the origin of the soul. Facts arranged in their

natural order suggest their own explanation. While we listen only to facts which speak for themselves, we are on firm ground.

1. Many of the physical organisms of the lower forms of life propagate themselves by self-division.
2. In a self-divided organism there is in the two halves physical identity.

Suppose that we have here [drawing a figure on the blackboard] what Haeckel calls a Moneron, one of the lowest types of life, an animal of irregular shape, a mass of protoplasm. It moves. It feeds itself. It grows. It has life. After it has grown to its natural size, it constricts itself in the middle [illustrating on the blackboard], and finally falls into two portions. Self-division like this is the simplest form of self-multiplication of organisms. There appears to be concerned here just that mysterious property which a living mass of bioplasm exhibits when we see it under the microscope throw out a promontory, which becomes detached at last, and then, as it takes up nutriment, goes on enlarging according to the law which governs its parent.

The supposition is that the mass of bioplasm is homogeneous, or of the same qualities throughout. The promontory it projects will be physically of the same qualities with the parent mass! When that promontory breaks off, there will be in the island the qualities it had as a promontory. Therefore, between the island and the original mass there will be physical identity. So when an organism, consisting of a homogeneous mass of bioplasm, multiplies itself

by self-division, the original organism and the subdivided halves are related to each other by physical identity.

3. In a self-divided organism, physical identity is transmitted by hereditary descent.

Here begins, but here by no means, as Haeckel thinks, ends, the explanation of the law that like breeds like. Two yet greater facts are equally demonstrable with the three already mentioned:—

4. The co-ordinating powers governing the movements of the two halves are also identical.

5. The co-ordinating power is therefore transmitted in hereditary descent.

In our subdivided organism here [referring to the blackboard], each half goes on acting as the parent did. Each takes up nutriment, and enlarges, and finally divides, as did its parent. These movements must have a cause. The laws of the movements are identical with the laws of the original organism. The co-ordinating power which we have proved to lie behind all the movements of organisms, we know, therefore, is transmitted here. Its effects are visibly the same here as they were there. The cycle of life through which that subdivided half passes is the same as that through which the parent passed. The co-ordinating power goes over; the physical power goes over.

6. Between the parent and the germ of the child, there exists, therefore, a double identity,—the one physical, and the other not physical; the one material, and the other not material.

7. On the basis of this double identity stands the supreme law of hereditary descent,—that every organism breeds true to its kind.

It is vastly important that we should take these earliest steps with great caution, and be sure of our ground at every point. We demonstrate by its effects that the co-ordinating power is transmitted in hereditary descent. We are sure, from all our previous arguments, that this co-ordinating power does not belong to matter. We have proved here, we think, that life in physical organisms is the power which co-ordinates the movements of germinal matter. That co-ordinating power existed as one life: now it exists as two lives. So much is certain. You say that it has divided itself. Very well; do not look into mysteries to-day. I do not know how one individual becomes two. The angels gaze on that casket, and do not understand what is within it. I am not pretending to illuminate mysteries. What we know beyond doubt is that in a self-divided organism one life becomes two lives. How one individual becomes two individuals, science does not know. We know *that* one does become two, but not *how* it does. When we examine facts, however, we can trace the action of this double identity, physical and immaterial. This undeniable circumstance explains much. Every organism breeds true to its kind, and it does so because a double identity exists between parent and child.

Self-multiplication by the division of organisms involves a production not only of two lives, but

of twenty, sometimes, out of one. You may take the water-polyp [illustrating on the blackboard], and chop it through the middle, and each part will develop into a perfect animal. Chop each of these through the middle, and each half will develop into a perfect animal; and so you may produce from one individual, it is said, forty. Many biologists affirm that in some lower organisms which are homogeneous throughout as many as forty lives can thus be produced from one. Of course if you take a bird from a bush or a twig from a tree, you cannot produce a whole organism from any one part; although, by the way, a twig from a tree as a scion may develop into a growth like its parent. You must have one of the lower organisms homogeneous throughout in order to give to each segment the power of reproducing itself. How all that occurs, nobody understands. If you wish me to speculate, I will say that the co-ordinating power goes over and that physical identity exists here. The co-ordinating power in the homogeneous animal is found in every part; and, when you divide and subdivide the organism, the co-ordinating power draws to itself from the outer world clothing in each of the fragments, as it drew to itself clothing in the whole animal originally. There are two kinds of ghosts,—tangible and intangible. Every organism is a tangible ghost. I am no Spiritualist. When I take as a guide a rat-hole revelation, it will be when the clouds obscure the sun at noon. [Applause.] In the water-polyp we have a co-ordinating power, and it is at-

tracting to itself a clothing. We subdivide the animal, and each part draws to itself similar clothing. We do not suppose that the co-ordinating power is increased or diminished. It was all in the original organism. It was all in the germ of that animal, and its forty lives have all been evolved from that original co-ordinating power. That is what we see. There are the facts. But how they were evolved, is more than we know. It is a mystery, perhaps, beyond plummet's sounding.

8. The double identity between the parent and the germ of the child is the cause of the likeness of the latter to the former.

9. *It is not physical sameness which accounts for the likeness of child to parent, but the sameness of the co-ordinating power.*

Many germs of different animals are chemically identical. The difference, therefore, in their development must be accounted for by the different co-ordinating powers behind them. It is, therefore, safe to assert, and it appears to me greatly important to emphasize the fact, that it is not a physical sameness which accounts for likeness of parent to child, but the sameness of the transmitted co-ordinating power. The sameness of life is the influence which produces the likeness between parent and child, and not the sameness of the famous firm that Virchow of Berlin calls "Carbon, Oxygen, & Co.," — a firm which, he thinks, has failed of late!

10. In the higher forms of self-multiplication, such as by budding and egg-cells, this law of double identity holds good.

Häckel says that all the laws of self-multiplication in its higher forms are involved substantially in the simple self-subdivision by which self-multiplication occurs in the lower forms. We have organisms that multiply by budding, and by seeds, and others by egg-cells; but at the last analysis there is a physical identity between parent and child, and an immaterial identity behind that physical identity. Häckel says that laws of hereditary descent may be summed up in the physical identity of parent and child. He holds that life is only a mechanical action of molecular particles. But we here have rejected his authority on that point. We hold that life is more than mechanical action. Häckel affirms (*History of Creation*, vol. i. p. 199, American edition) that "the life of every organic individual is nothing but a connected chain of very complicated material phenomena of motion." Virchow knows better than that. Lotze knows better than that. We know better than that. This doctrine of Häckel's has lately been suffering severe persecution in Germany; and I shall not pause, at the end of perhaps twenty lectures against the mechanical theory, to justify the definition of life as the co-ordinating power behind germinal matter.

11. Vitality, life, and soul are to be carefully distinguished from each other.

12. In the higher forms of self-multiplication there is vitality in each of the two elements which unite to form a germ.

In the oak, for instance, we have self-multiplication by stamen and pistils, and their two elements, which

unite to form the acorn and fructify it. Now, in each of these two parts there is vitality. Life, as the co-ordinating power of the whole organism, does not belong to either of them taken alone. Vitality may belong to an individual cell, but not life. It is certain, that, in a complex organism, you may destroy many a cell, and the co-ordinating power or plan of the whole organism not change. On the surface of the cellular integument we lose cells which possess vitality; but life, the co-ordinating power, is precisely the same, although you lose cell after cell from the cellular integument, and from every other part of the system. From not making this distinction between vitality and life, the greatest blunders have been committed in biological reasoning. A co-ordinating of movements must occur before we have evidence of the existence of what we call the co-ordinating power.

13. After the union of the two elements, there is life; that is, a power co-ordinating the movements of germinal matter according to the laws of its type.

Does anybody doubt this? When an acorn begins to sprout, do you doubt that there is in that acorn a co-ordinating power which begins to weave the oak? The instant the co-ordinating force, which ultimately produces your king of the forest, commences its work in that acorn, life is there. What is life? Co-ordinating power behind the movements of germinal matter. A structuring power must exist before any thing is structured. Crush your germinant acorn, and you kill an oak. You perceive that I am treading here on holy ground.

14. If the two parts which are united by the pistils and stamens of the flowers of the oak are destroyed, that which is destroyed is not life, but vitality.

15. If an acorn be destroyed after it has become germinant, not merely vitality is destroyed, but life.

16. *This law holds good in all the higher organizations, not excepting man.*

I am passing here across chasms in which lie dead men's bones, and dead women's, not merely in China, not merely among the seven hills of Rome, not merely among Romanists, but among Protestants, and under the shadow of church-spires on the Christian sward of New England. [Applause.] Dr. Storer is the authority for you to read; and a famous essay of his ("Why Not?" Lee & Shepard, 1875), scattered broadcast over America by vote of the American Medical Association, I need only name to give sufficient emphasis to unspeakable matters here visible, but not audible.

17. The authorities of the medical profession are right, therefore, in speaking of a certain nameless crime, or the destruction of pre-natal life, as murder.

Do you say that in the human case there is no oak destroyed? What? You affirm that, to make any organism human, there must be in it a soul, and that, until a soul exists in it, the organism is merely an animal. What makes a soul? Memory, conscience, are essential parts of the human spirit. When does memory start up in a human being? What are the first things you can remember? Ruskin, there on

one of the English lakes, looks under the arched roots of the cedars, and beholds water gleaming in the sun. There began his conscious life. He had no memory of any event before that, or, at least, none that would hold for his subsequent years. He was an animal until then, was he? It would have been no crime to have killed him before that, would it? Richter, an infant in the presence of the Fichtelgebirge, looks up one day, and sees an avalanche fall. It is his first memory. Till then there was nothing in him that had the capacity to treasure up experience for his subsequent years. Then began in him the permanent activities of which we call memory; and a being is not possessed of a soul until he is possessed of a memory, you say. Kill Richter, then, any time before he attains memory, and you have committed no crime. But, in order to have a soul, a being must have a conscience; and when does a child acquire moral responsibility? Law says when it is seven years of age. In some children we see the action of conscience earlier; but is there a developed conscience before the third or fourth year? Now, if there be no soul until there is a conscience, kill any child before it comes to a sense of what is morally right or wrong, and you have killed only an animal. I dare not trust myself here to speak as the topic deserves; but, I had rather you would listen to the Romish confessional, which always makes a crime of that which the highest medical authorities in the name of Dr. Storer have denounced, I had rather you would listen behind curtains to the severe doc-

trines of the Romish confessional, than behind the curtains of portions of fashionable society to the whispered lies used in defence of the ghastly murder of the unborn ! [Applause.]

18. If a babe cannot be said to be other than an animal until it has a soul, and if it has no soul until it has a memory, and if the destruction of its life is not a crime until it has a soul, then it is usually no crime to take the life of an infant under one year of age.

19. If a babe that has no conscience may be guiltlessly murdered, then, until a child arrives at an age of three or five years, the killing of it is no crime.

20. By self-division, there may be produced from one life many lives.

21. The new lives are created by being evolved.

22. They were all in the capacities of the original type of the co-ordinating power.

23. The power of matter is a gift from God, under limits of necessity.

24. The power of life in man is a gift under concession of freedom.

25. God is immanent in mind as well as matter.

26. Molecular law may be the profoundest expression of the Divine will.

27. The continuity of nature is only the continuity of the Divine plan and its execution.

28. A thorough-going recognition of the Divine immanence and omnipresence both in mind and matter is the only explanation of the origin of souls and of the laws of hereditary descent.

Our best symbol of the origin of life is, therefore, not Michael Angelo's, with the spark passing in a mechanical manner from the creative finger to the created hand, but the cloud enveloping the tabernacle. The theory of the Divine immanence in both mind and matter, does not deny for an instant the Divine transcendence over both. The creative power throws out souls into the universe as a flame throws out other flames. It is not diminished. It is itself not transferred. Perfect distinctness between the original life and the life which is kindled! No diminution of the power of the unapproachable Flame which kindles all finite lives! A magnet may create other magnets, and yet not diminish its own power, or lose its separateness from the powers it creates. The magnetism in all souls is from God, and yet different from him. The kindling of all finite lives is God's, although the flames are distinct individualities. [Applause.]

IX.

SEVEN PRINCIPAL LAWS OF HEREDITY.

**THE NINETY-NINTH LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, FEB. 4.**

Spin, spin, Clotho, spin!
Lachesis, twist! and Atropos, sever!
Darkness is strong, and so is Sin,
But only God endures forever!

Villa Franca.

Who is the happy husband? He
Who, scanning his unwedded life,
Thanks Heaven, with a conscience free,
'Twas faithful to his future wife.

COVENTRY PATMORE.

IX.

SEVEN PRINCIPAL LAWS OF HEREDITY.

PRELUDE ON CURRENT EVENTS.

THE able-bodied pauper deserves and seems likely to be improved off the face of the earth. Unskillfully organized, hap-hazard Christian philanthropy is food on which he fattens.

We do the work of going from house to house by proxy; and, from year to year, let slip the opportunity of obtaining clear ideas concerning the shrewdest methods of poor-relief. Twenty centuries will discuss this topic yet. In addition to measures of colonization, land-ownership, and a re-distribution of the unemployed, it will be found remunerative to cast a glance at Elberfeld on the Rhine, and Germantown on the Schuylkill, where very successful experiments have been made in the abolition of able-bodied pauperism.

The city of Elberfeld, in Germany, is near Dusseldorf, and has at present a population of about eighty thousand inhabitants. By a judicious system of district visitation, it has reduced the number of

its paupers from one in ten to one in eighty. To-day there is no able-bodied pauperism in Elberfeld. This result has attracted attention in Great Britain, and has been imitated in the district of Marylebone, in the city of London, with great success. There have been imitations of it in New-York City on a small scale, and especially in Germantown in Philadelphia. At this moment the most strategic words concerning poor-relief are Elberfeld and Germantown. In Boston, Springfield, Rochester, and Syracuse, some imitation has been commenced of the Elberfeld enterprise.

What was done in this German city? Very much what Chalmers did in Edinburgh, when he began his famous experiment at the West Port. The whole poor-quarter was districted and sub-districted; and the rule was adopted, never to give out charity except when the reasons for doing so were clear to a committee of intelligent ladies and gentlemen who had visited personally the cases in need. One central regulation at Elberfeld was, that no visitor should have more than four families on his hands. There were eighteen districts, and each was subdivided into fourteen smaller portions. Voluntary aid and the city official relief were united. Eighteen men were selected by the municipal government to superintend the districts; and then in each sub-district a number of visitors were appointed to report to these super-visors. There were some two hundred and fifty visitors, men and women. No one was allowed to have a burdensome field. Often the number of families

put down to one individual for visitation was only two. The service of visitation was unpaid, as was also that of general supervision; but so was the work distributed, that no busy merchant, no head of a family, no matron with children under her care, felt burdened. It is an easy possibility to lay out work on a scale so large as to prevent its performance; but, if we were humbler in our programme, probably the actual work performed, in the visitation of our desolate quarters in cities, would be more searching. Who visited these places? The best class of the community in Elberfeld. Little by little it came to be a mark of good standing, to go down among the poor, and attend to three or four families as a part of the duties of the week. We have persons who will rise and go out of an audience if the topic of poor-relief is introduced too often. They are silken, soft Christians, brought up in kings' palaces; and their religion consists chiefly of enjoying the meeting on a Sunday. There is another kind of meeting that occurs when one goes about from house to house doing good, and this they do not enjoy. Until American Christians learn to do what German officials have taught average citizens under the State Church to do at Elberfeld, there will be no proper quickening here of our sense of responsibility for the perishing and dangerous quarters of great towns. There must be an institution of a new order of nobility. It was instituted, indeed, when our Lord washed his disciples' feet, and when he went about from house to house doing good.

Those who wish to enter into that nobility, even with our Lord at its head, are none too many, even in the church within the church. The very best of our Christians are altogether too perfunctory, distant, and lavender, in their touches of these problems.

What has been done in Germantown? That is the twenty-second ward of Philadelphia, and contains twenty-five thousand people. A union of ladies and gentlemen was formed there, and they made it a rule never to give money to any poor person. Even coal was distributed cautiously. Their plan included careful visitation, after Chalmers's principle, and territorial supervision of small districts. They put fifty visitors at work under the general direction of nine men and one salaried superintendent. I regard the Philadelphia experiment as exceedingly suggestive for American soil. The German experiment needs a little change in being transferred to our country. A board of supervisors, all men, governed a board of visitors, all women; but the head of the enterprise was Robert Coulter, a salaried superintendent, whose business it was to look into every case professionally.

The first difficulty the Germantown enterprise had was indiscriminate almsgiving at the doors of private houses. Of course, if we toss out charity miscellaneous on the thresholds of our homes, an enterprise like this Germantown Relief Association will languish. The ladies who were visitors had cards printed, and distributed among the households; and whenever a beggar applied at a private door his name was ascer-

tained, and he was sent to Robert Coulter with a ticket. Only a small percentage of the cards thus given out were ever presented to that intelligent officer.

Of course you have done something like that in Boston; but the trouble is, we have not brought the charities of all the religious denominations under a common plan on this subject. We have had here in Boston seventeen generals, I presume,—seventy, for aught I know,—over this work of poor-relief. Let every church do its own business, you say. That is well; but this Germantown plan of a union of churches is better. Let every denomination unite its churches, you say. This plan, which has been executed with considerable thoroughness in most of our large American cities, is an excellent one; but a better one would be for churches of all denominations to unite their purely philanthropic activities, so that the able-bodied pauper who cannot get relief in one parish may not emigrate to another, and obtain relief there. The Church Congress in New York lately favored a central bureau for church aid in poor-relief. Of course there will be constant imposition unless there is some general supervision in such work. There will be running over bounds by tramps; and, what the unprincipled beggar cannot get at one door, he will find at another. Some churches, too, are not efficient; and it will be very hard to supply a city equally with benevolent visitation and relief under the plan of letting each church act by itself.

Some think that the churches of the evangelical denominations are not benefited by union, if the organization representing the union looks like a supplementary body. But the palm needs the fingers, and these are not a separate palm. The benevolent associations which take care of missions on other shores are fingers to the palm of the church; the benevolent associations which take care of the orphans and the blind and the deaf, all at the bottom unite with the church, and are only fingers to its palm. They are in no sense rivals. So our employment bureaus, and young men's Christian associations, are in no sense rivals of the church. I am not defending the idea of erecting young men's Christian associations into separate churches, or of making them or any other union organization in any particular independent of the body of God's house, any more than the fingers are independent of the palm. The advocacy of such separation is all brush-fire talk, and amounts to nothing. When an American evangelist is accused of holding the idea of forming a new ecclesiastical order, and erecting young men's Christian associations into churches, the charge is only a specimen of copperhead attack of a man who has foes enough ahead of him. [Applause.]

There is a necessity for a union not only of churches of one denomination, but of all the leading denominations, if we are to have any thing like the Elberfeld plan or the Germantown carried out. One of the results effected at Philadelphia was a very

careful ascertainment of the history of individual cases, and a registration of the persons relieved or applying for aid. A tramp soon becomes known if there is a union between the churches. His record is understood in all parts of the city by being understood at the central agency. If there is no union of the churches, a cheat in one parish, found out, may usually become a successful cheat in another parish which has no intelligence of what its neighbors have ascertained.

In this Germantown relief enterprise, evidence accumulates, that, outside of poorhouse relief, not more than two dollars an individual has been required among those assisted annually by that work. Not more than eleven dollars expense a year for a family has been incurred since that Germantown experiment began. None of this expense is given out in cash. It is all supplied in tea and clothing, and occasionally coal and other necessary articles. Visitation among the poor, to be effective, must become skilled labor. Such it has become in Elberfeld and Germantown. The vote of one visitor, with that of the superintendent, is necessary to the giving of any supply in the Philadelphia experiment. The judicial principle in charity has been applied in Germantown as in Elberfeld. The visitors have learned to give not so much money as themselves, and to make a business of this. The results in the American have been as encouraging as those in the German field. Very often the moral influence of the visitor has drawn into lives of endeavor and thrift

those who had almost taken up the career of pillage under the name of penury. Again and again relief has been prevented from becoming a mischief because given out indiscriminately at thresholds. A tramp called at a Philadelphia door, and said his wife was dying, and that she had no medicine, food, or clothing. "Give him a card."—"No," said one of the ladies: "his tone proves his sincerity; we must help him now."—"That card will do me no good," said the tramp: "I have three like it in my pocket already. Why can't you help a poor man?" The gentleman of the house came out: "Why are not your cards attended to? I am a member of the relief board, and I will go with you, and see about this." He went with the man to the central agency, and found that he was a person just out of the penitentiary, and had no wife in this country, and that his history was well known to the police. The tramp did not dare present his cards to the superintendent.

Of course those who most need help are often those who never apply for it; and until we go from house to house, each with a little field, and not merely by proxy, there will be no ascertaining the wants of those who, like a widow I heard of in the North End last winter, went through two days of a fearful storm similar to that which has just swept the country, and without a fire, and with but one meal in the forty-eight hours. When she was found at last, her little daughter was lying, not dead, but white with hunger and cold; and the woman was the wife of a minister,

and had been thrown into that condition by bereavement, and by her pride in refusing to ask for any assistance. How are you to find out these cases unless there is searching district visitation? And where are the slippared mesdames and the soft, velvety mesdemoiselles that anywhere in this city call themselves Christians, and do not feel honored to enter into competition with each other in work of that nobility? [Applause.]

After all, we must unite three great spirits if we are to solve this problem. Tiberius Gracchus must attend to the re-distribution of the unemployed; then George Peabody had better build lodging-houses; and, lastly, Thomas Chalmers must whisper to us renewed enthusiasm concerning his schemes. These were really better than those of Elberfeld or Germantown. It is fashionable now to talk about Germantown and Elberfeld; but there is one great measure they leave out, which Chalmers employed, — that of self-supporting churches among the poor. But that measure ought to be courageously imitated. Until the poor are taught to diffuse conscientiousness among themselves, until there is a training of these children in the gutters up to better principles than their fathers and mothers have had, until the poor become self-respecting, by doing something, however little, in the support of moral instruction in their midst, we have not done for them what can be done. That West Port experiment in Edinburgh seems to me altogether the most suggestive that ever has been performed, because it included not only the measure

of searching visitation, not only judicial discrimination in charity, not only the principle of skilled labor there, but also the idea of self-supporting religious institutions.

Thirty thousand people in the North End of Boston are crushed into less than three-quarters of a square mile. Take Lynn, or Salem, with about this number of inhabitants, and with its beautiful parks and wholesome grounds around private residences, and crush the city together little by little. First the parks go; then the grounds go; then the stables come near to the thresholds; finally you have the gutters close under the windows. Sprinkle in your gin-shops, make the whole place peppery and measly with the unreportable quarters of vice, and then let children be born there, and you have the North End. But this North End has in it certain self-supporting religious institutions, or would like to have,—some have been begun there,—and what does Boston do? Starves them! Chalmers stands above us, and Prince Albert and George Peabody and Tiberius Gracchus, and look on; while Boston, the easiest-managed city of its size on this continent, calls her self abreast of the times.

On the coast of North Carolina, the cold dead bodies have hardly been picked up yet from a late shipwreck. I was in Philadelphia to lecture last week; and there men stood before the office of Collins, whose ship had gone down. The workingmen had their hats in their hands, humbly postured, asking for work at the hazard of a voyage like that

which had brought death to their comrades. Women were on their knees imploring information as to their husbands or sons. No news had come up out of the surly deep. The ship had gone out overloaded or unseaworthy. Some conscientious New York governmental official had given her the usual certificate that she was fit to go to sea; and she went to the bottom. Nevertheless, there stood these working-men, and wives were on their knees weeping for dead workingmen; but the men said, with hat in hand, "Is there any ship going pretty soon to Brazil to build a railroad? Very glad to be passengers. Is there a little work?" Why, there are conscientiousness, and often unfathomed tenderness, heroism, and nobleness, among the poor; and if you will only trust these traits, if you will give the churches among them a start, if you will stand by the half-starved men that are doing something for them, you will have a blessing from above; but otherwise, a curse. [Applause.]

The flag carried even in Boston lately, above the heads of five thousand people, with the motto on it, "Hunger knows no law," is likely to be seen again in America. Until you raise against that ill-omened ensign precisely the Biblical idea of going from house to house doing good, with the purpose of making the masses Christian, God only knows whether the black flag will not ultimately give us permanent trouble in every municipality governed by universal suffrage. We must listen to Chalmers, and to Prince Albert and George Peabody, and to Tiberius Grac-

chus. But, above all that company of spirits, there is One whom most of us call Master, and who, as I believe, is yet in the world. He speaks to us whenever conscience speaks with the still small voice, and he whispers to us imperatively; and yet we treat his words with as little honor as we do those of experience itself. By and by we shall render in our account, and it will be said to us, "Depart! for ye saw me in need of clothing and religious instruction at the North End in Boston, at the Five Points in New York, at the Seven Dials in London, in the faubourgs of Paris, in New Orleans, in Chicago, in San Francisco; and ye knew that my poor were in need, and likely to be more and more in need; and ye passed by on the other side." There is little condemnation more severe in poignancy than that which will come to the Christian on his dying bed, if he has neglected the opportunity of imitating his Lord by going about from house to house, caring for the poor. [Applause.]

THE LECTURE.

An Arabian philosopher said, "O God, be kind to the wicked! Thou hast been sufficiently kind to the good in making them good." We are surprised to find that an infant which has done no evil may inherit evil. A human being is presumably innocent on coming into the world; but we often bring with us most terrific predispositions, such as inflict upon us unhappiness throughout life. Bad traits descend by inheritance, but so do good traits; and if, there-

fore, this morning I am to draw before you a dark picture, I must put by the side of it a bright one. The left hand and the right hand in the government of the universe are contrasted as are the antipodes of the world; but even antipodes are parts of one circle. Possibly we shall find that, after all, the right and left hand of the laws of hereditary descent are adapted to each other, may easily be clasped the one upon the other, and that behind the two hands is only one form and one heart, and that Almighty God's. The descent of bad traits may be a blessing, although one of another sort than the descent of good traits. It is evident that the two laws operate together under the control of one almighty purpose, — that of moulding humanity into — it does not yet appear what, but into something like its Author.

[Applause.]

I am accustomed to summarize the laws of hereditary descent under seven heads, — direct heredity, reversional heredity, collateral heredity, co-equal heredity, pre-marital heredity, pre-natal heredity, and initial heredity.

1. By direct heredity is meant the usual action of the laws of descent. The child resembles its parents; and yet, as Ribot has said, we must distinguish under this head two different sets of facts. In the first place, a child may resemble both its parents equally; in the next place, it may resemble one of them peculiarly; but in that second class we must distinguish two sub-classes, — the likeness may be in the same sex, or not; that is, the son may resemble the father

and the daughter the mother, or the son the mother and the daughter the father.

2. Reversional heredity occurs when the child resembles its grandparent. This is called atavism in the technical language of the books; and we are very sure, from observation, that it is one of the most influential laws of hereditary descent. The grandson often resembles his grandfather, and the granddaughter her grandmother. There is no possibility of explaining the traits of individuals without using this law of reversional heredity perhaps three times out of ten. Judgments differ as to the average of the number of cases to which the law must be applied, but they are numerous.

3. Collateral heredity occurs when the child resembles an uncle or aunt, or some one of its relatives out of the direct line of descent. This often happens. It is one of the curious phenomena of inherited traits, that nobody knows how to predict in advance what will happen. As to many of the subtler results of the laws of hereditary descent, we know only that they appear. We do not understand their causes; nobody pretends to understand them. Nevertheless, our ignorance of the causes does not imply ignorance of the effects. We are certain that there is a law of reversional heredity, and a law of collateral heredity, although we do not know in detail what lies behind the laws.

4. Co-equal heredity is the name of that law by which, in the large average, the numbers of the two sexes are mysteriously preserved in substantial equality.

5. There is a form of heredity which may be called the pre-marital, and it is seen when the child of a second or third marriage resembles the husband in a previous marriage.

6. A form of heredity which may be called pre-natal is observed where good or bad, fortunate or unfortunate influences, which have powerfully affected the mother as such, are exhibited in good or bad results of the greatest importance in the life of the offspring. It is said that the mother of Napoleon read Plutarch's Lives and other heroic literature, and that her moods of mind were transferred to her son. This law, as to the existence of which all the ages are agreed, is pre-natal heredity; and the range of it is limited to the real pre-natal life of the child.

7. Lastly, we have what probably is the most important form of inheritance except the first. I call it initial heredity, because this portion of the laws of hereditary descent turns upon the temporary mood, good or bad, fortunate or unfortunate, of parents when they become such. Ribot, in his elaborate work on Heredity (p. 147, American edition), mentions only four of these laws. He omits the fourth, the sixth, and the seventh; and his analysis is therefore curiously incomplete. I am not aware that the seventh has ever been called by the name here given to it. The first, the fourth, and the last of the seven forms of heredity, are undoubtedly the most powerful of the circumstances which determine the horoscope of our lives.

Never shall I forget standing in the hall of busts

of the emperors at Rome, and studying the face of Agrippina, mother of Nero, and the organization of Nero himself at different ages, and finding in the predecessors of Nero just the traits which re-appeared in himself. You know what a sensual thickening of the lower face, and of the space between the neck and chin, existed in Agrippina, Nero's mother, in spite of the general symmetry of her face and the fineness of fibre of her Italian temperament. She had ability, perfidy, ambition, capacity for intrigue, and cruelty also, in the service of her predominant traits. You cannot look into her face in marble, even, without noticing that she was one of the fools who are caught by the pleasures which Cicero has justly said are by no means the greatest, — the sensual class of indulgences. Her organization was not coarse, and yet it was low. From such a mother, whom he finally caused to be murdered, this Nero inherited just the same neck, the same perfidious expression, the same tendency to cruelty, the same forehead. There is in Nero, I think, much more of the mother than of the father, for the bust of the latter looks like that of a weakling. He amounted to almost nothing, except that what little force he had was evil. Ahenobarbus, the father of Nero, was stained with crimes of every kind. He was accused of murder, adultery, and incest, and escaped execution only by the death of Tiberius. You remember that, when congratulated on the birth of his son, afterward Nero, he replied that whatever was sprung from him and Agrippina could only bring

ruin to the state. We have in Nero, at different ages, a repetition of what must have been the mood of Agrippina at different ages. I remember a bust of Nero at eighteen or twenty years of age, exhibiting brutal coarseness, perfidy, and the puffy face of physical indulgence. A bust representing him later in life shows a withered lower face, contrasting oddly with the dewlap in the chin, and the thick neck. His last busts show these same traits, together with a wrinkled forehead and scornful and lawless lips; and yet the fibre of the man's brain and face was not so bad as the form of both.

Turn to the other side of the hall, however, in Rome, and you will see Marcus Aurelius, the most virtuous, perhaps, of all the emperors. As surely as infernal traits went down upon Nero, celestial ones went down upon Marcus Aurelius. I suppose the latter was no more to be praised for what he inherited than Nero was to be blamed for what came to him exclusively through the laws of hereditary descent. I hold that Nero was sane. Some historians have gone so far as to suppose that his bad traits quenched in him moral responsibility; but he had freedom of will, and was responsible for the bad use he made of his inheritance. Marcus Aurelius, on the other side, seems to have been pushed from before birth into the position of a philosopher, and a saint of the pagan sort. He had by inheritance a predisposition to the virtues which his reign exhibited.

Now, was Providence unkind to Nero? Was

Providence partial to Marcus Aurelius? To the third and fourth generations bad traits go down. To the third and fourth generations good traits go down. These are facts. What does Providence mean by them?

There are the seven laws of hereditary descent. It turns out that a good initial heredity may produce virtue in the descendant by predisposition merely from a temporarily ennobled nature, although there was in general vice in the parents; and so a bad direct heredity. The apparent injustice of Providence is mitigated by this seventh law. If you are in a lofty mood, Providence is on your side; but when a drunkard, on the one hand, or when, on the other, a man generally temperate, but in a temporary debauch, places himself under the power of these laws of heredity, that seventh principle acts just as surely to produce an inheritance of evil as it does in the opposite case to produce an inheritance of good. Have you not known some idiot born in an able family? I know one who all his life goes about congratulating his friends, "Good-morning, sir;" "A fine day, sir." Nobody, without similar experience, can measure the long reaches of the knives that must pass up and down in the soul of the father of that idiot, for he was one of the ablest men of the commonwealth in which he lived; but he was temporarily a drunkard, and God cursed him through that law of initial heredity. Have you not known children more highly gifted than their parents, or inheriting the excellences of one or both in a higher

degree than was attained by the parents except temporarily?

Initial heredity is a law which has two edges, both belonging to the same sword, which has but one hilt, and is held in but one Hand. Let us not accuse God too early.

That I may not seem to be uttering blasphemy, let me transfer the unspeakable topic of hereditary descent to a lower plane. Here is the Commonwealth of Massachusetts. What if she should make a law that every man who is habitually intemperate shall lose good judgment? We should say that she is terribly in earnest. That is a fearful thing to do. Would you vote for any such a regulation? Probably not, if you have been educated liberally. Take away a man's judgment for habitual intemperance? Why, the thing he most needs under such temptation is sound judgment; and to crush in his good sense is to tempt him more, and perhaps to ruin him! Ask me to vote for a law that every man who is habitually intemperate shall lose good judgment? Not I. I have been better brought up. I was born in Boston. There is a commonwealth of which we have heard, where the laws are not passed by count of heads and clack of tongues,—a commonwealth governed by superior Powers, among which there is no vacancy waiting to be filled by any human election; and in that commonwealth such is the law, and it is executed every time. [Applause.] What do you think that commonwealth means? It is terribly in earnest. It is terribly partisan. It has an opinion

as to the difference between intemperance and temperance. If across the vault of the sky were written that opinion in letters of fire, it could not be proclaimed more emphatically than it is by the law that every habitually intemperate man loses good judgment.

But now, will you vote for a law in Massachusetts, providing that every man who is habitually and persistently intemperate shall have every nerve tracked by pain, shall find the very holy of holies of the physical organism invaded by hot pincers, shall be put upon the rack, and tortured as if demons had him, and shall go hence in delirium tremens? Very few men would vote for such a law as that. It is a terrible thing to injure a man's health. His family depends on him; children depend on him; orphans are to be regarded. We must be liberal. There cannot possibly be passed any such regulation unless we forget the interests of wives and of these little ones who are not responsible for coming into the world. Surely liberalism will have no support to give to a law by which habitual intemperance incapacitates a man for the supporting of his family. There is, however, a Power yonder which seems not to be governed by sentiment like this; which has made a law that every habitually intemperate man shall have his veins tortured, and shall have every nerve seized in red-hot pincers. That government is terribly in earnest. That is what it does. It does that every time. You know that. There is not a particle of doubt on this subject. There is not a scintilla of

unrest in men's minds on this whole topic. What do you suppose the government means?

But now, what if it should be enacted in Massachusetts, in addition to both these other laws, that every habitually intemperate man shall transmit a diseased constitution to his offspring, and that this injury to the health of the children shall endure to the third and fourth generation? Who would vote for such a regulation? Where is the man educated in Arnoldism, where is the man brought up on the platitudes of Spencerian Nescience, where is the person who thinks that, on the whole, whatever we do, the nature of things is on our side, where is the man that believes that it is safe to teach the people to rely on an opportunity for repentance after death, that would not exclaim with horror if a proposition were made to him to pass such a law: "Is thy servant a dog, that he should do this thing?" If Massachusetts should adopt such a law, and execute it every time, you would be sure of two things, at least: that she is terribly partisan, and that she is terribly in earnest. The Supreme Powers have enacted such a law, and executed it every time; and they have not made an apology for six thousand years. [Applause.]

Evidently, the first thing to be said about this terrific earnestness of the Powers above is what has already been hinted,—that the law of initial heredity belongs to virtue just as much as to vice. Suppose that when these laws were passed in Massachusetts, it should also be enacted that every man who lives a

virtuous life, every man who fills his soul with the Divine Spirit, every man who by self-surrender to natural laws puts their power on his side, shall be blessed above his anticipation, shall have good judgment given him when he did not possess it before, shall have health as a kind of perpetual intoxication, shall have the power to transmit to another generation better conditions than his own. You say that you would vote for such a law, but not for its opposite. Of course not. Man's vote is not asked for in the passage of natural laws. It is not to be supposed, that, because you would vote for what you call the kind regulations, you would vote for the stern ones. Not you! Every thing must be callow and mucilaginous in your government. The government of the universe is not callow at all. There is an Ebal yonder, and a Gerizim also. With you, however, there must be an upper, but not an under; there must be a right hand, but not a left hand; there must be a before, but not an after. But yonder different ideas prevail. The truth is that your regulations, the moment they were put in force, would become a curse, deep, multiplex, immeasurable.

Who does not see that the terrific seriousness of the laws of hereditary descent, instead of being an injustice, is a proclamation to every man to institute a reform? Who does not see that the sternness of what is done on the left hand pushes humanity into the softness of the right hand? Who does not see that God makes all his chastisements like the mother's tossing of her infant upon her knees? This is for

the sake of health. He makes them to be like obstacles laid down in the path of a child learning to walk. A little clambering is an education.

If, after all their allurement of promise and their threat of doom, there is at last no hope of reform, what do the laws of hereditary descent do? They put an end to the earthly existence of the transgressor. When I meditate on the severity of the laws of hereditary descent, I am relieved by remembering that the earthly career of vice is short. Before the eyes of exact observation in this world, the thoroughly vicious family is at last burned up. So much we know beyond a peradventure as to the fires of the universe. One of the greatest curses pronounced alike by the Scriptures and natural law upon evil is that it shall have no name long in the earth.

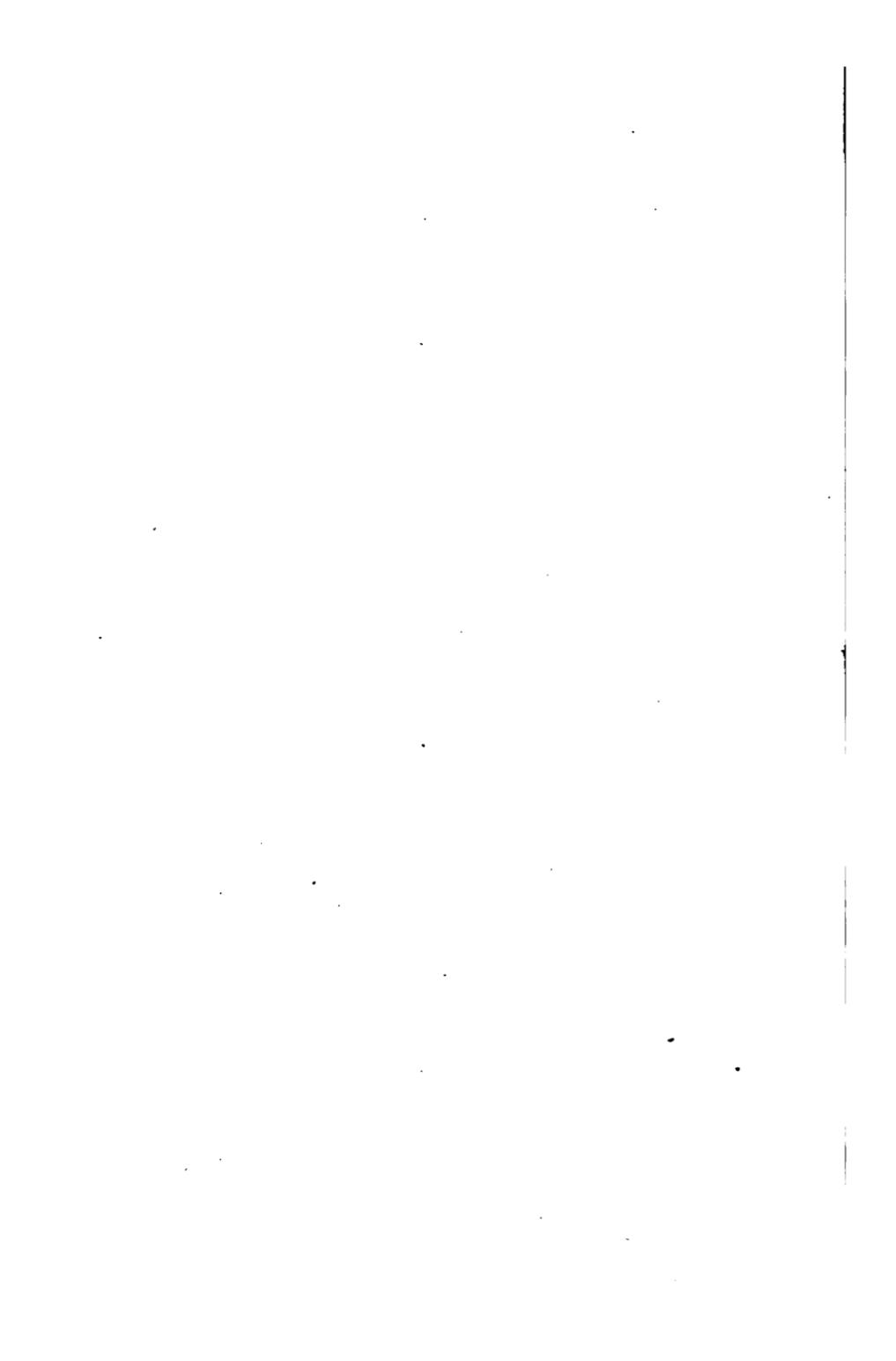
You say that often evil dispositions are inherited through many generations. Sometimes people who are half vicious and half virtuous, if such expressions may be allowed, puzzle the world in families that live century after century. Yes; in spite of the severity of the laws of hereditary descent, God gives every half-breed a chance. He suffers long with a man who has received burdens out of the ancestral spaces, and comes weighted into life. He gives him an opportunity, and puts by his side these laws of heredity, reversal, collateral, pre-marital, pre-natal, and initial. Direct heredity does not choke him. Five other laws of heredity stand by him, if natural law is obeyed. Every human being has all the chances represented by the seven laws of hereditary descent.

But when the Supreme Power sees that no chance is improved, then it allows the laws of heredity to shut down upon the transgressors, and they are removed from the earth.

What good does that riddance or removal do? It has been justly said that the ages are kept from being insane by the cradles and by death. If we could not get rid of disordered human organizations, what would happen to the centuries? Oliver Wendell Holmes remarks that most people think that any difficulty of a physical sort can be cured if a physician is called early enough. "Yes," he replies, "but early enough would commonly be two hundred years in advance." Concerning the terrific earnestness of Nature, it is certain that she means well, even in her severities, and that we must treat her as we would a kind commonwealth.

There is one service that the Supreme Powers are willing to do for us, and which I have not supposed human power to endeavor to effect in a parallel case. The Supreme Powers have a law, of the existence of which we have seen the proof here, that, whenever a man submits himself utterly to that divine force in him which we call conscience, a new set of affections shall be given him by a re-arrangement of his nature. A light will stream in through dome windows which before were curtained. There will come into the depths of his life a quickening and transforming power, utterly unobtainable except by total self-surrender to conscience. The worst case of sane heredity is no exception to this law. Take a man who is

born like Nero, and let him surrender to conscience, and then those terrific steeds, which have dashed off the track with him, become coursers of fire on the line where God would have him drive. It is not a bad thing for a man to have a tempest in the lower half of his face, if only he has a hurricane in the upper half. [Applause.]



X.

THE DESCENT OF BAD TRAITS AND GOOD.

**THE ONE HUNDREDTH LECTURE IN THE BOSTON
MONDAY LECTURESHIP, DELIVERED IN
TREMONT TEMPLE, FEB. 11.**

De male quæsitus gaudet non tertius hæres. — BELLOCHII *Praxis
Moralis.*

As Heaven and Earth are fairer, fairer far
Than Chaos and blank Darkness, though once chiefs;
And as we show beyond that Heaven and Earth
In form and shape compact and beautiful,
In will, in action free, companionship,
And thousand other signs of purer life;
So on our heels a fresh perfection treads,
A power more strong in beauty, born of us,
And fated to excel us, as we pass
In glory that old Darkness.

KEATS: *Hyperion.*

X.

THE DESCENT OF BAD TRAITS AND GOOD.

PRELUDE ON CURRENT EVENTS.

IT is becoming necessary for the whole world to understand Russia. The Bosphorus now flows into the Thames. A few prophets, among whom I do not rank myself, are audacious enough to predict that by and by the Thames will flow into the Bosphorus. Napoleon's famous saying, that the power which governs Constantinople may easily become mistress of Europe and Asia, has behind it, no doubt, a piercing military sagacity in the study of strategic geographical lines. The Thames is the water-front of the globe to-day; but, if a power able to occupy the natural capacities of Constantinople were to possess the Bosphorus, who knows but that, little by little, that stream might become the water-front of Asia and Europe? It has geographical advantages of the most marvellous sort. For one, I believe that the attraction of America will so influence European commerce, that the Tiber of the world, the central stream of the planet, will be the Atlantic, and not

the Bosphorus. But I am willing to admit that the commercial front of Asia and of Europe may ultimately take up its position, not on the coasts of China or India, not on the shores of France or England, but on the waters of Constantinople.

The lesser is becoming a greater question of the East. Whatever may be thought of details in the Eastern problem, no one can deny that it is likely to assume Asiatic proportions. Finally the boundaries of the English and the Russian possessions in Asia will touch each other. The petty states between British India and the great Russian Empire will melt away. There is now between the two nothing that deserves to be called an independent territory. Already Russia is occupying a Chinese province on pretext that the Celestial Empire cannot keep order, and prevent her citizens from outraging Russians. She has occupied Saghalien close to Japan, and once belonging to the Japanese Empire. She appears to be outwitting England at this moment [applause] in one of the boldest games ever played in history for the possession of a position which she covets more than any other on the planet. [Applause.]

Americans are by no means outside the range of complications that may arise in Asia. Who is there here that is not proud of our American colleges at Beirût and on the Bosphorus? Who does not know that if the tide of influence be turned from Europe toward Asia, instead of from Asia toward Europe, inside the domain of what has been called Turkey,

the hour has come for the American scholars at Beirût, and in Robert College on the Bosphorus, to arise and shine? I know how Russia drove all missionaries from her borders in 1846. If the slightest peril of extinction by Russia is to encompass Robert College at Constantinople, and the great American institutions at Beirût, there is no American scholar, to say nothing of American divines, there is no American patriot, that will not feel himself wounded in a cause greater than any American, English, or Russian interest. The time seems to have come for serious thought on this side of the Atlantic to express itself vigorously against any repetition of the precedent of 1846, by which Russia drove all teachers of a faith other than her own outside of her borders. [Applause.] 1878 is not 1846; and that fact must be recognized in the Russian calendar, as it is in the English and American. [Applause.]

One thousand years ago, when, according to the testimony of Bryant, the Norse shallop were sailing up Massachusetts Bay, the Russians occupied only an insignificant province near the head-waters of the Dnieper. To-day they govern one-seventh part of the continental portion of the globe. What are the causes which have produced the expansion of Russia? A very difficult question; and yet recent information given us by Wallace, and by our own statesman missionary Hamlin, and by many official documents, may enable us to guess why Russia has expanded so rapidly. One of the causes accounting for her growth is agricultural necessity. Her peasants are not farm-

ers of the scientific order. The soil becomes rapidly exhausted under their methods of tillage. High-farming is almost unknown on the prairie-lands of Russia. Consequently, as the population has grown, new stretches of territory have been called for; and, as no great mountain-chains were in the way, expansion towards the sunrise was easy. Self-defence, too, has enlarged Russia. Attacked by marauding hordes along her southern border, she has often felt herself obliged to protect herself against Tartar provinces by their annexation. High political aims, however, have urged the expansion of Russia toward the west and the south. Her chief physical deficiency is a lack of seaports. It is commonplace to notice the fact that Russia wants the right of way by water into the Mediterranean; but it is not quite commonplace, at least in England, to grant that she has justice on her side in this great political and commercial desire. As no one here is responsible for my opinions, perhaps you will allow me to say that a people who have lately manumitted their serfs, and who govern a stretch of territory extending from the Baltic to our Behrings Straits, a population of eighty-five millions, ought to be allowed their maritime rights as well as their rights on the land. [Applause.]

Who supposes that giving the Russians the power to pass through the Dardanelles will give them entire control of Constantinople? That city for a considerable period will need to be under very peculiar government, if Russia can send her iron-clads unde-

its roofs at will, and the rest of Europe is *not* to be thrown into tremor. But it is a matter of natural right, I suppose, that Russia, if under trustworthy bonds to keep the peace,—a great *if*!—should be admitted to the Levantine Sea. On that condition she should have what she has been seeking for hundreds of years,—the right of way into the open oceans of the globe. England seems unlikely to object to such a right of way on the part of Russia, provided her own right of way is not impeded. Will England have free course to India if Russia has free course through the Levantine Sea? How many debates may arise concerning the Suez Canal? How far may Russia misuse her power, if able at last to attack England from both the sea and the land?

Undoubtedly, were she to attack India only from the north, she would have many disadvantages. There is a great probability that if the Russian bear and the English lion should lock jaws in the fastnesses of the Cashmere vale, the bear would go back to his icebergs, lame at least, if not cold! [Applause.] Were there an English-speaking alliance on the globe, and were the American eagle to watch any such conflict from a crag, looking down on these two rivals, I think the beasts would never meet. [Applause.] We need such moral influences brought to the support of the British Empire in the Christian purposes of the better portion of the English people, as shall keep down war in the interior of Asia, and so take the bloody heart out of this greater Eastern problem.

Everybody, I think, will allow me to affirm that we have seen the beginning of the end of the Turkish power in Europe. Mohammedanism will decline so far as it has been a force on the sunset side of the Bosphorus. But now, unless great good judgment is employed, there can hardly be an avoidance of a collision, or certainly not of misunderstanding, between Great Britain and Russia in the heart of Asia. When that collision comes, or is threatened, can America do any thing toward bettering the conditions of the solution of the greater Eastern question? If you will stand by your American missionaries, you may do much toward casting light among the Mohammedan people who now lie as a wedge between Russia and India. If you will not shut your doors on the Pacific coast, you may do much toward sending out Christianity through returning Chinamen into the greatest empire of Asia. [Applause.] When the Chinese question comes before Congress, the repeal of the Burlingame treaty, I hope, is not likely to be effected. America has some part to take in regard to the greater question of the East: Her work is to be performed in the Christian manner, by the spreading abroad of schools among the Asiatic populations, by shooting the slant javelins of the gospel's radiance into Chinese Tartary, into Thibet, into Persia, into Arabia, into Asia Minor, into Syria, and by *not* putting a tax on every Chinaman who comes here! [Applause.] Let us have impartial police regulations both for the Chinese and the whizzing hoodlums of San Francisco. Let us apply

beneficent law in California to both white men and yellow men. [Applause.] The Chinaman divides all Americans into two classes,—the men who fleece him and those who would educate him. Let us put ourselves on the side of those who would educate the reflux Chinese immigration; a rill now, but likely to deepen and broaden, and to become a most valuable means of evangelizing the Chinese Empire. It is more than important that America should not obtain a bad name in Asia. Let us remember that when the American scholar Van Dyke, at Beirût, sits down, and gives the Scriptures voice in an Arabic translation so perfect that native scholars of Damascus and Mecca say it resembles the Koran itself in purity of diction,—he is probably addressing more people than speak the English language. The Arabic, in its common and in its printed forms, taken together, is the language of a hundred millions of people. I saw, when at Beirût, an extended list of books which have been translated by our scholars there into Arabic. Some of them were mathematical works, some of them medical, some of them astronomical, a great majority of them religious; and I remember that as I held this list up under the shadow of Lebanon, and waved it to and fro in the hot wind that moved out of Egypt, I said to Dr. Van Dyke, "There is the best flag that America has raised abroad." Let us not dishonor that ensign. Let us permit no Russian or Asiatic power to dishonor it. Lord Shaftesbury and Sir Stratford de Redcliffe affirm that the American missionaries are

the most remarkable men in the East, and the most essential, not only to its religious, but also to its social and political salvation. [Applause.] When I sailed through the *Æ*gean, I was with Homer, and I looked back toward the promontory at Beirût, crowned with American schools of the first rank; I looked toward the towers of Robert College, on which our Hamlin had raised, and was lifting and lowering as our steamer passed by, the American flag; and I felt that so far as the solution of the question of the East, in its Asiatic proportions, is concerned, America, little as the fact is emphasized as yet, has a part to act grander than was ever played by the heroes of the Iliad. Her heroes are at Beirût and on the Bosphorus in the colleges, and yonder at San Francisco in the Chinese schools. [Applause.]

THE LECTURE.

In the days of chivalry a marriage was usually contracted with a sacred regard of the demands of natural law, and not merely of those of social or personal caprice. There were often required from both parties careful certificates, not only of noble descent, but of courage, loyalty, piety, and all the chivalric virtues it was desired to transmit. Infidelity sometimes thinks that it has exclusive possession of the topic of the hereditary descent of good traits and bad. If you put your ear upon the ground, and listen, as it is my duty to do, as a student of the signs of the times and an outlook committee

here, to the subterranean noises of discussion, you will find not a few of them coming from pickaxes, undermining faith in the natural laws which proclaim that the family is a divine institution. Approaching the delirious traitors who handle these ill-omened weapons, you will find that there burns above their foreheads a miner's light, composed chiefly of blue fire. And yet there is sometimes one streak of white flame in it. These sappers of the foundations of society profess a desire to have mankind improved by obedience to natural law. Although their method of improving the race would usually land it in moral chaos, one of their central purposes is not a bad one, —namely, to secure enlarged obedience to natural law, as the method of raising the average intellectual and moral merit of the human family. Christianity has had that motive for ages. She has understood, ever since the Decalogue was proclaimed, that the good and bad traits of parents descend to the third and fourth generations. She was the first to reverence woman adequately. Even in what you call the half-benighted Jewish system of life, woman received honor such as was shown to her nowhere else on the planet. The Marys, the Ruths, the Sarahs,—they whose appellations, coming down across all the turmoil of the years, are honored yet as among the foremost female names of all time,—were growths of what you call the scrawny, stunted tree of Judaism, the root out of which has sprung Christianity. Sweet was the root; majestic is the tree. My feeling is, that, were you to cut down the tree, and were

you to deracinate that root, there is little philosophy on the globe that could be depended upon to perpetuate the family. [Applause.]

Suppose that we have here a marking-machine or a vertical plank [illustrating on the blackboard], against which a million men, one after the other, stand, while the height of each is dotted upon it. Let the measurement be repeated with other millions of the same race, living under the same conditions with the first million. It will be found that there is a substantially unchanged average height for any million, year after year. The dots representing the height of the different individuals will range over quite a space. There will be a few very short men, and a few very tall ones. Let a line representing the average height of a million be drawn through the cloud of dots. On both sides of that average line the dots will diminish in number as they recede from the average. Notice where the dot representing the least height stands, and where the dot representing the greatest height stands. Divide the distance from the lowest to the highest point into equal spaces: We find but a very few dots in the upper space, and a very few in the lower; but if you will tell me where this average lies, and how many points there are in that upper square, I can calculate, according to mathematical law, what the number of points would be in the other squares. Experience and theory correspond with marvellous closeness inside the range of such spaces. This is the famous law of deviation from an average, of which such extensive

use has been made by Quetelet, the astronomer-royal of Belgium, the highest authority on vital and social statistics. (See QUETELET, *Letters on Probabilities*, translated by DOWNES, London, 1849.)

The vagrant dots in these equal spaces above and below the line of average follow a law so perfectly, that, from knowing one part of the apparently unsymmetrical arrangement, you can draw the map of the rest. If these dots were bullet-marks, they would follow the same law of deviation from an average. Stand yonder with your regiment, and fire your bullets against the plank. Aim them all against this central line. Some will strike below it, some above it, and some will strike the line itself; but when you have determined your average, and the number of bullet-marks in any square, the law of deviation from an average will enable you to estimate with great precision the number of bullet-marks in any other of the squares.

Now, what has this to do with hereditary descent? A million men of the same race, brought up here to this measuring-machine, are proved to have heights governed by a fixed law of deviations from an average. It is to be presumed, therefore, that their weight, their muscular strength, the size of their chests and brains, and every one of their physical traits, are governed by a law of averages. But, if a great variety of physical traits may be shown to depend on the law of average in this way, the mental traits may be also. If you can prove that this law of averages governs the majority of the physical

traits of the race, it also touches their mental traits. Scientific observers are agreed in assuming that there is a law of averages applying to mental and moral as well as to the physical capacities in the individuals of the race. At the top of the mental scale we have genius; at the bottom stupidity. Determine the position of the average line between these two extremes, divide the space between top and bottom equally, and then ascertain the number of cases represented by any one space, high or low, and you may determine by the law of averages the number in every other space. (See GALTON's use of QUETELET's law, *Hereditary Genius*, American edition, pp. 26-32.)

How can the average ability of the race be raised by the application of the laws of hereditary descent?

In putting this question before you, I am perfectly aware that I am venturing into chaos, or, at least, into regions where it is difficult to find firm ground on which to put down the foot. I am not speaking here at random, but cautiously selecting the few sound conclusions which science has reached, and combining them in such a manner that we may see, if our eyes are open, the trend of investigation on this most blazing of all social themes. It is the duty of this lectureship not to skip difficulties. [Applause.] Milton, you know, sends out Satan across chaos, and he is to build a road under himself as he proceeds to the Garden of Eden. I am on an expedition of similar difficulty, but of diametrically opposite purpose and direction. [Applause.] In the

name of the laws of hereditary descent, let us have courage to build a road the other way, from Eden out across chaos over the outer works of infamy and degradation, and through the gates of death, into the caverns of the lost spirits. Let us, standing upon the mighty parapet of loyalty to natural truth, that is, to God's will as revealed in the family, build a bridge out from it into the world of souls in chains and darkness, and meet Satan half-way, throttling him backward beyond the forms of Sin and Death.

[Applause.]

These are the twelve propositions on which I dare put foot, after a prolonged study of this theme:—

1. The best results for the improvement of the race will be attained by obedience not to a few, nor to most, but to all of the seven laws of heredity,—direct, reversional, collateral, co-equal, pre-marital, pre-natal, and initial. (For definitions of these terms see the ninety-ninth Boston Monday Lecture.)

Here are the seven laws of hereditary descent, and you and I cannot vote them up or down. We may obey them, or disobey them; but, if the race is to be improved to the utmost by the application of these laws, the first thing to feel sure about is that we must obey, not one or several, but all of them. The trouble with most reforms of the wild sort is that they are merely fragmentary attempts at loyalty to nature. They put into the foreground some one of these seven principles, and not all of them. Nature revengest herself always for any partial loyalty with which we serve her. [Applause.]

2. The law of co-equal heredity is the loud proclamation of monogamy as of natural — that is, of divine — ordainment.

3. The law of initial heredity has a similar meaning.

We are on holy ground. We may well pause here to allow our thoughts time to suggest much which ought not to be uttered audibly. There is a mysterious law by which the numbers of the two portions of the human family are preserved in substantial equality. Emigration may change the proportion of the sexes. It is by no means denied by me, that in some districts of the world the numbers of one sex predominate over those of the other. But, on the large average, in the natural arrangement of things, there is an astonishing equality preserved between these numbers by a fixed natural law. That significant arrangement I call co-equal heredity. Now, if you admit that marriage is a natural state, it is natural for every man ; and it follows therefore, mathematically, and on this topic there is no louder proclamation in the universe, that the law of co-equal heredity is the Divine ordainment of monogamy. [Applause.] Your thoughts are following this line of remark farther than my words have carried you ; and I am willing that they should follow it on and on, until, in the councils which preceded the formation of the world, you find the Divine fiat regulating Paradise. By natural law, Eden consists of Adam and Eve, and not of Adam and two Eves or twenty. [Applause.] There has been no departure from this

law of nature since the career of man opened. The fiat as to co-equal heredity, exhibited in the earliest historic documents, has certainly not been changed for sixty centuries. God has been expressing his mind as to social arrangements these six thousand years. From the beginning he has uttered but one voice. He has always maintained the law of co-equal heredity, and by it has maintained the law of monogamy as the natural ideal. [Applause.] I defy any man who reveres the scientific method, or who loves to think boldly, north, south, east, and west, to look into the arrangements of nature on this topic, and find support for any other party than God's own, as a guide for future civilization. I should be almost willing, were men sure to obey wholly the dictates of what we call nature, to leave the justification of monogamy exclusively to those who correctly understand co-equal and initial heredity.

Did Shakspeare know of what he was talking when he spoke of the green-eyed monster called jealousy? Have the poets in all ages been blind when they have asserted that there are passions through which the words "mine" and "thine" obtain terrific emphasis inside the range of social and family life? If the law of co-equal heredity proclaims monogamy, so does that of initial heredity. If there is to be a supreme affection, there is, of course, to be a guarding of it; and if the poets, if the philosophers, if all who have studied the human heart, are not wrong in assigning to jealousy a force suffi-

cient to burst social mountains, making them crack open like so much baked volcanic clay, in revulsion after revulsion ; if jealousy has always been one of the high explosives in human history, you may put this force, too, on the side of monogamy, for there is where God intended that its power should be expended. [Applause.]

4. The average ability of the race is not equal to its present tasks.

Galton says that men in modern times are in danger of being drugged into imbecility. There is hardly any class of the advanced intellectual laborers of the world, that does not need a higher grade of ability to meet its tasks. You, sir [turning to the Rev. Dr. R. S. Storrs], were telling us last evening, how to solve the great problem of the government of cities. You were showing us how cities reach all the globe ; and, as some of us listened, we were wishing that we oftener had leadership like yours into these wildernesses of iniquity, greed, and pelf, where men are trampled down every day merely because they are not strong enough for their tasks. We want higher ability in every grade of intellectual activity ; nor is the physical capacity of the race equal to the demands made upon it by modern civilization.

5. Whatever light science can throw upon the methods of improving the average ability of the race, consistently with the natural institution of monogamy, is, therefore, needed, and should be diffused.

We are not so far advanced, I hope, as to despise the social wisdom of the age of chivalry.

6. The intermarriage of highly gifted relatives tends to diminish rather than to increase the ability of the race.

Niebuhr says that aristocracies, when obliged to recruit their numbers among themselves, fall into decay, and often into insanity, dementia, and imbecility. Who does not know that this truth might be illustrated by vast ranges of historical knowledge, were there time here for the presentation of details? The Lagidæ and Seleucidæ for ten hundred years intermarried, and through nine hundred years were in a process of mysterious decay. The opinion of many of our Revolutionary fathers was, that half the thrones of Europe were filled by persons more or less erratic on account of descending from relatives. It was one of the propositions Jefferson often talked about in private, that the high places of Europe were filled with imbeciles, the results of consanguineous marriages. The rule of the Church of England to-day on this topic is more strict than has been that of some decayed royal houses.

7. The marriage of highly-gifted persons of different lines of descent is a method of improving the upper, but only the upper, that is, the most intellectual and virtuous, portion of the human family.

Face to face with the question, What is God's sifting-machine in his own application of the laws of hereditary descent to man's improvement? I must whisper, that, for one, I think there is an indication in nature as to what parties should enter into marriage. It is a solemn moment. This house is still.

Do not say that I am uttering blasphemy if I affirm that God speaks in a pure and permanent first love. Is there a human being of the average order, to whom Providence does not send that indication of duty? When it is sent, it is to be respected as a Divine sign. We are not left in ignorance on this most critical of all points. I hold that in the laws of the supreme affections a pillar of fire is set up before men, for their guidance; and, if the noble prefer the noble, it is well they should. That is for the benefit of the race. If the degraded prefer the degraded, how do we know but that is well they should? Extinction is before them the sooner. We have learned to face terrific facts here; and among other facts we have faced the circumstance that God puts an end to an incorrigibly wicked family in this world. The subtle laws by which supreme affections are determined are the sifting-machine of the Divine powers. And, subtle as the laws are; discussed foolishly in parlor, in pulpit, in press, and on the platform; degraded age after age by vice; prated about only too superficially by poetry, they nevertheless have retained their sanctity. All around the globe, the word that hushes humanity quickest, next after the name of God, is the name of first love. Such is the fact of human experience; and when I stand here to assert that the Divine indications in this particular are not given out at random, and that, where a supreme affection is granted, there a Divine indication of duty is to be discerned, you will find the better part of the philosophy of the globe on

my side; you will find the better part of poetry on my side. Of what have the best singers loved to tell us oftenest, if it be not of the first supreme affection? Where is there any thing so hallowed, inside the whole range of secular discussion, as this unspeakable theme? God grant that the spirit of our German fathers, who found, according to Tacitus, something celestial in woman, who revered her responses, and buried the adulterer alive in the mud, and whipped the adulteress through the streets, may be the permanent principle of our Anglo-Saxon civilization! for, if it be not, I foresee only the fate of Rome for the sins of Rome, only the fate of Sardanapalus for the sins of Sardanapalus. The vengeance of decay has seized upon every nation that has violated these subtile laws. Hereditary descent itself becomes a consuming curse to every luxurious age that loses its purity or falls into such callousness that it cannot discern God's touch in these supreme natural indications of his will. [Applause.]

8. Even were the marriage of highly-gifted persons of different lines of descent to be made the custom of civilization, there would yet remain in the lower portion of the race a majority of beings of inferior minds of which heredity would perpetuate the deficiencies. (RIBOT, *Heredity*, American edition, pp. 289-300.)

Men talk superficially of this theme who suppose that it is a simple one, and that, if we could make arrangements to suit ourselves, the average ability of the race might easily be lifted to twice its present

height. You might lift a portion of the ability and moral merit of the race by the measure here discussed; but even then you would lift but a portion. There would be, I suppose, more than half the numerical size of the race below the average needed by our tasks. What shall be done with that lower portion of humanity? Is the problem concerning its improvement by hereditary descent yet insoluble?

9. The superior has naturally a supreme affection for the superior, and not for the inferior.

10. Many writers hold that a physically and morally superior race united with an inferior one lowers itself without raising the other, so that all such alliances are a loss to civilization.

The question is whether such marriages are justified by the subtle indications of which I have been speaking with bated breath. If they are not, beware how you cross the current of God's purposes in natural law! You say the current is not very swift here. But if it is a current which God urges on, no matter how slowly it moves, it carries with it the infinites and the eternities, and you must not try to stem the force of what is deeper than all thought can sound, and more powerful than imagination can measure. Slight indications, you say? My feeling is that the instinct of the poets is right, and that the severest philosophical thought on this topic is right. Each proclaims precisely what many writers do in the name of exact historical investigation,—that usually there is a physical and a moral deterioration in the case supposed. Of course I remember what inter-

marrying has done for nations standing nearly on a level with each other. But the inferior race is not lifted as much as the higher is lowered, when the difference in the level of the two is great originally.

11. There has hardly been produced in history a great nation, or a great man, not composed of very diverse inherited complementary elements; but the intermingling has usually been of strong bloods.

12. The application of the laws of hereditary descent to human improvement is, therefore, beset with great natural difficulties, and will continue to be so, until, by other means than the laws of heredity, the intellectual, and especially the moral, averages of merit in the human family shall be greatly heightened.

Dana in his *Geology* raises the question whether a being better than man is to succeed the human race on this planet. (*The Geological Story briefly told*, pp. 253-255.) Superior to any form of life now on the globe, what will be that future creature, as much better than man as he is better than the brutes which he follows in the line of development? We know, as Agassiz has taught us, that the fish and the serpent have horizontal spinal columns, but that the highest animal organisms below our own have spinal columns in oblique position, and that at last man has attained the erect attitude, and so has fulfilled the possibilities of his anatomical structure. But there are those who say, that, just as in past geological ages there were premonitions of better things to come, so in this

last geological age, in the filling-up of man's ethical capacities, and in the descent upon him of a spiritual power not his own, there is a prediction perfectly parallel to many a prophecy made in the geological ages that have gone by, of a world in which a superior being will appear, and of which the law will be righteousness. [Applause.]

BOSTON MONDAY LECTURES.

By JOSEPH COOK.

HISTORY OF THE LECTURES.

The Bibliotheca Sacra, January, 1878.

Mr. JOSEPH COOK was invited, early in September, 1875, by the Young Men's Christian Association of Boston, to lead the noon prayer-meeting in the Meionaon daily for a week, and to make on each occasion an address of half an hour in length. After four of these services, it was found that the audience had quadrupled in size. Mr. Cook was requested to continue his addresses daily through another week. On Monday noon, Sept. 23, the subject was "Final Permanence of Moral Character; or, The Doctrine of Future Punishment," and it was noticed that a hundred ministers were in the audience. Mr. Cook was then requested to speak on the Atonement, on a Sabbath evening, in Park-street Church. He complied with this request, and spoke to an audience filling the house to its utmost capacity. He was then invited by the Young Men's Christian Association to speak every Monday noon, in the Meionaon, for twelve weeks. Oct. 23 his subject was "Boston Sceptical Cliques." "The Daily Advertiser" had a reporter present, who reproduced a part of the address. "The Springfield Republican" began to call attention to the large number of ministers and scholars who were present at the Monday Lectures. It was suggested, in many quarters, that these lectures should be continued regularly through the winter. Meantime, Mr. Cook was delivering one course of lectures at Amherst College, and another at Mount Holyoke Seminary, largely on Materialism, Evolution, and various biological topics. The Meionaon Hall seats about eight hundred persons, and in January, 1876, was completely filled by Mr. Cook's hearers. After four months had passed, the assemblies were occasionally gathered in Bromfield-street Church. The lectures continued to be under the auspices of the Young Men's Christian Association, until May, 1876, when, at a meeting in Bromfield-street Church, resolutions were passed founding the Boston Monday Lectureship, and placing it, for the next season, under the care of a committee, consisting of Prof. E. P. Gould of the Newton Theological Institute, the Rev. Dr. E. B. Webb of Boston, the Rev. Dr. McKeown, the Rev. Samuel Cutler, the Rev. Mr. Deming, the Rev. Edward Edmunds, and the Rev. W. M. Baker,—men of different evangelical denominations. The lectures for 1875-76 continued eight months, and closed, with the forty-fifth of the course, on the last Monday in May, in Bromfield-street Church.

In October, 1876, the lectures were resumed in the Meionaon; but the hall was found to be too small for the audience. It was,

therefore, soon transferred to Park-street Church. Two lectures were given in this large auditorium, when it was found to be much too small, and the audiences were crowded out into Tremont Temple. The first lecture there was given Nov. 13, 1876. This hall will contain from twenty-five hundred to three thousand people, and was often more than full in the winter of 1876-77. During the delivery of a course of thirteen lectures on "Biology," and of eleven on "Transcendentalism," and of eleven on "Orthodoxy," it was often necessary to turn hearers away, as they could not obtain standing-room. From the forty-fifth lecture "The Boston Daily Advertiser" published full stenographic reports of the lectures. The reporter's manuscript was revised by the lecturer. "The New-York Independent" regularly republished the lectures from February, 1876. "The Cincinnati Gazette" did the same; and a large number of newspapers throughout the country published extracts from them. In the course of the winter a few replies to certain statements in the lectures were made by Rev. Dr. James Freeman Clarke and other Unitarians, by Rev. Dr. Miner and other Universalist ministers.

From February, 1876, most of the Boston Monday Lectures were republished in London by the firm of R. D. Dickinson, Farringdon Street. Individual lectures were republished in "The Christian World Pulpit," and other theological serials of Great Britain. At the close of the course for 1876-77, in May, eighty lectures had been given, of which all from the forty-fifth had been published. In September, 1877, James R. Osgood and Company issued "Biology, with Preludes on Current Events," a collection of thirteen Boston Monday Lectures. This volume, at the beginning of December, 1877, was in its twelfth edition. In November the same house issued another course of Mr. Cook's lectures, entitled "Transcendentalism," and announced still another course, entitled "Orthodoxy."

Oct. 1, a course of ten lectures on "Conscience" was opened, and, Dec. 10, a course of ten on "Hereditary Descent." Full stenographic reports, revised by Mr. Cook, are now published in "The Boston Daily Advertiser," "The New-York Independent," "The Cincinnati Gazette," and "The New-York Advocate." Very numerous other papers publish large extracts from them. At least a hundred thousand copies appear weekly. The lectures are regularly republished in London.

It ought to be added, that since the close of his lectures in May, 1877, Mr. Cook has delivered several of them in New-York city, Rochester and Syracuse, N.Y., Princeton, N.J., and various other places; has also supplied various pulpits in Boston and other cities. Before a critic passes any severe criticism on these lectures, he may wisely ask himself whether, without having a previously established reputation, he would be able for two years to interest congregations containing sometimes fifteen hundred hearers, of whom sometimes five hundred are liberally educated men, assembled in the midst of pressing engagements, and in the whirl of a great city; and whether, in addition to his Monday-noon exercises, he would be able to superintend the printing of three volumes of his lectures on abstruse and complicated themes, to preach frequently on the sabbath, and occasionally to deliver sermons, each one of which is from one to two hours in length.

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CRITICAL ESTIMATES (AMERICAN).

Rev. Prof. A. P. Peabody of Harvard University, in The Independent.

Joseph Cook is a phenomenon to be accounted for. No other American orator has done what he has done, or any thing like it, and, prior to the experiment, no voice would have been bold enough to predict its success.

We reviewed Mr. Cook's "Lectures on Biology" with unqualified praise. In the present volume we find tokens of the same genius, the same intensity of feeling, the same lightning flashes of impassioned eloquence, the same viselike hold on the rapt attention and absorbing interest of his hearers and readers. We are sure that we are unbiassed by the change of subject; for, though we dissent from some of the dogmas which the author recognizes in passing, there is hardly one of his consecutive trains of thought in which we are not in harmony with him, or one of his skirmishes in which our sympathies are not wholly on his side.

Rev. Dr. Thomas Hill, Ex-President of Harvard University, in the Christian Register.

The attempt of sundry critics to depreciate Mr. Cook's science, because he is a minister, is very ill judged. These Lectures are crowded so full of knowledge, of thought, of argument, illumined with such passages of eloquence and power, spiced so frequently with deep-cutting though good-natured irony, that I could make no abstract from them, without utterly mutilating them.

The Princeton Review.

Mr. Cook has already become famous; and these Lectures are among the chief works that have, and we may say justly, made him so. Their celebrity is due partly to the place and circumstances of

their delivery, but still more to their inherent power, without which no adventitious aids could have lifted them into the deserved prominence they have attained. . . . Mr. Cook is a great master of analysis. . . . The Lecture on the Atonement is generally just, able, and unanswerable. . . . We think, on the whole, that Mr. Cook shows singular justness of view in his manner of treating the most difficult and perplexing themes, for example, God in Natural Law, and the Trinity.

Springfield Republican.

This new preacher of modern Orthodoxy delivered his Fifty-first Monday Lecture under the caption "Life or Mechanism — Which?" this week in the Boston Park-street Church, which was crowded — even to the galleries, aisles, and pulpit-stairs — with an audience mostly composed of men, and representing, to a large degree, the culture and intellect of Boston and vicinity. This Monday Lecture-ship is now an established institution, and in its growing popularity will tax pretty severely the quality of Mr. Cook. He has so far, however, met the issue squarely, and shows no signs of emptiness or flagging. . . . Mr. Cook has in his favor a happy combination of personal advantages, — a good presence, mental grasp, considerable personal magnetism, logical alertness and acuteness; a habit of minute and precise analysis, with sufficient repetition of important details; a poetic and dramatic gift, lighting up what might else be dry and heavy with frequent flashes of wit and fancy, and literary and historical illustration; a restless fervor, the outcome of an excess of physical nervousness, which, however, is never disconcerted; and withal, a fine mastery of good, copious Saxon English.

Boston Daily Advertiser.

At high noon on Monday, Tremont Temple was packed to suffocation and overflowing, although five thousand people were in the Tabernacle at the same hour. The Temple audience consisted chiefly of men, and was of distinguished quality, containing hundreds of persons well known in the learned professions. Wendell Phillips, Edward Everett Hale, Bronson Alcott, and many other citizens of eminence, sat on the platform. No better proof than the character of the audience could have been desired to show that Mr. Cook's popularity as a lecturer is not confined to the evangelical denominations. (Feb. 7.)

It is not often that Boston people honor a public lecturer so much as to crowd to hear him at the noontide of a week-day; and when it does this month after month, the fact is proof positive that his subject is one of engrossing interest. Mr. Cook, perhaps more than any gentleman in the lecture-field the past few years, has been so honored. (Feb. 14.)

The Independent.

We know of no man that is doing more to-day to show the reasonableness of Christianity, and the unreasonableness of unbelief; nor do we know of any one who is doing it with such admirable tolerance, yet dramatic intensity.

George M. Beard, M.D., in the New-York Graphic.

It is said that Mr. Cook misrepresents modern science. This criticism is made mostly by those who do not read all his books; or judge by the original reports at the beginning of the series, or by floating

fragments in the papers, or by general hearsay; or very likely by those who themselves know little of science, or at least who are not versed on all sides of his subjects. His work, as it now stands, after many and careful revisions, represents fairly the present state of science on the subject of which he treats, — of the very latest and best researches. Indeed inquirers who will read all of his work, and not part of it, and who are sufficiently endowed with the scientific sense to separate the philosophical reasonings from the facts on which the reasonings are based, will find therein the clearest and most compact statements of the theories and difficulties of evolution, of the movements of bioplasm, and of physiological experiments on decapitated animals and on the electrical irritation of the brain, that appear in popular literature.

Professor John McCrady, in The Literary World.

Mr. Cook's Lectures upon Biology have done good service in making known to a Boston audience the researches of such men as Lionel Beale in England, and the thoughts of such men as Hermann Lotze in Germany, besides the admissions and inconsistencies of the practical materialists, and a valuable review of the whole state of the battle by an able and fearless theological observer like himself. The publication of these Lectures cannot fail to be of service to the extra-scientific world in general. The book well presents to outsiders a certain little-known stage of conservative scientific thought, which they cannot reach anywhere else in so accessible and compact a form. Its extremely popular form, though quite disturbing to the nervous equilibrium of a confirmed man of science, is, nevertheless, well fitted for those it aims to inform, — the great free, intelligent, and religious-minded public, who have not had their heads squeezed by specialistic boards and bandages into strange and fantastic models of approved scientific monstrosity; the people, in short, who have not made philosophical Flatheads of themselves for the sake of some narrow mole's track of scientific investigation known as a "specialty."

This *specialism*, indeed, is aiming to destroy all freedom of thought and speech, and, by consequence, all philosophic thought whatsoever, by forbidding every man to express an opinion on any subject save his own specialty. It has all the narrow intolerance of Comte's Positivism; and I, for one, honor Mr. Cook for his courage in taking it by the beard, and defying it. I heartily recommend his book to the careful reading of everybody who has the interest of scientific conservative thought at heart. Such an one will, at the least, rise from its perusal with a conception of the existing state of the great battle between spirit and matter, very different from that which Mr. Huxley, with the voice of a dragon, lays down in his "Physical Basis of Life;" and, instead of "matter and law devouring spirit and spontaneity," he will see how great cause there is for anticipating the opposite result.

Indeed, the progress of science means, to my apprehension, the very opposite of all that Mr. Huxley contends for in that essay. Spirit and spontaneity are slowly indeed, but surely, advancing along a path which will end in their completely devouring matter and law. The reality of the universe will prove to be the spirit; the illusion of it, the matter; while natural law will declare itself nothing more than the self-consistency of untrammeled spontaneity.

Professor Borden P. Bovone of Boston University, in the Sunday Afternoon.

In the chapters on the Theories of Life, these discussions are, in many respects, models of argument; and the descriptions of the facts under discussion are often unrivalled for both scientific exactness, and rhetorical adequacy of language. In the present state of the debate there is no better manual of the argument than the work in hand. The emptiness of the mechanical explanation of life was never more clearly shown.

Appletons' Journal.

It may be said that the distinguishing and striking characteristic of Mr. Cook's work is, that he pours out the treasures of the latest German thought before audiences and readers whose ideas of science and philosophy have been moulded almost exclusively by that English school, which, as Taine says, tends naturally (by racial inheritance) to materialistic views of life. Our knowledge of the author is confined to what we can obtain from his book; but this is amply sufficient to show that his intellectual equipment has been obtained in Germany, and is truly German in its comprehensiveness and precision. . . . Aside from the rhetorical brilliancy of his style, and the aptness and fertility of his illustrations, Mr. Cook's method of exposition is remarkably effective. By numbering his propositions, and stating them in the concisest possible phrase, he secures a clearness and intelligibility that are seldom so well maintained in a long and complicated argument; and the epigrammatic guise in which most of his principles and conclusions are presented impresses them with peculiar vividness upon the mind of the reader or hearer.

The Eclectic Magazine.

Mr. Cook's rhetorical and literary skill would obtain him a hearing on any subject he chose to discuss; but it is very soon seen, that, beneath the glowing and almost too fervidly eloquent language, there is a force of logic, a breadth of intellectual culture, and a mastery of all the issues involved, such as are seldom exhibited by participants on either side in the great controversy between religion and science. It may be said unqualifiedly that the pulpit has never brought such comprehensiveness and precision of knowledge, combined with such logical and literary skill, to the discussion of the questions raised by the supposed tendency of biological discovery.

International Review.

The lecture-form is retained, and the implied comments of the audience, as given by the reporters, are furnished us,—a feature which will strike readers favorably or otherwise, as their ideas are more or less severe on the composition and make-up of a book. For our part, we like this feature.

The Advance (Chicago).

The reasons given for retaining the responses of the audience, applause, &c., seem to us in this case satisfactory. It is frequently as much a matter of significant interest to know how statements were received by such an audience as to know what the one individual said. This Boston Lectureship is altogether unique in

the recent history of popular exposition of abstruse themes. One has to go back to the time of Peter Abelard of the University of Paris for a parallel to it.

The Interior (Chicago).

These Lectures are full of hard thought and eloquent expression. They dwell on the profoundest religious themes, and in the most incisive way. The same power of analysis, sharpness and precision of statement, and gorgeous rhetoric, which characterized the volume on "Biology," are conspicuous here. In these two volumes Mr. Cook has given us the most forcible and readable of all modern defences of essential Christian truth against the scientific and philosophic heresies of the day.

The Standard (Chicago).

The incisive, trenchant style of Mr. Cook has, perhaps, no more admirable adaptation and application than to the demolition of the glittering but specious logic of materialistic philosophy. It is a pleasure to the intellect, as well as to the conscience, to follow Mr. Cook in his irresistible iconoclasm among the images of the theorists who substitute evolution for God in the grand process of cosmogony.

Cincinnati Gazette.

It must be admitted by the most captious critic, that Mr. Cook states his positions with wonderful grace and clearness, and that he fortifies what may appear most paradoxical by a remarkable array of illustration and argument.

Boston Traveller.

There is no denying the fact that Mr. Cook is a born orator. As a popular platform speaker, he has few rivals, and, broadly speaking, we might say no superiors.

Boston Journal.

These Discourses relate to the great problems of life most at issue between science and religion. They were received with eager interest when delivered; and, being republished in whole or in part by the American and English papers, they were, in effect, spoken to an audience on both sides of the sea. Mr. Cook's eloquent and picturesque style—which has in it a touch of Emerson and a touch of Carlyle, as well as qualities peculiarly its own—loses little by transference from the platform to the printed page; and, indeed, the latter form of presentation has its advantages, as being more conducive to the calm and leisure which subjects of so much importance require for their adequate consideration.

New-York Christian Intelligencer.

We believe this book ought to stand and will stand among the very first of the Apologies of the last quarter of this century.

The Christian Union.

Mr. Cook is profoundly interested in his themes. Indeed, he never fails to be kindled into enthusiasm by their transcendent

importance. He understands the reach of the physiological questions which he discusses, and the philosophical problems which he essays to solve. His mind is penetrating and subtle. He delights in an argument, and is the last man to fear an antagonist. It would not be easy to decide whether he possesses the logical or the imaginative powers in excess.

Illustrated Christian Weekly.

We enjoy the splendor of Mr. Cook's rhetoric and the brilliancy of his imagination, as in reading a poem.

Church Journal (New York).

His style is peculiar. It is clear, abounding in most expressive figures, with perhaps a slight shading of Carlyleism. But we do not now recall a more forcible writer of the day. His blows at Parkerism, Huxleyism, and Darwinism, come down with sledge-hammer force. He is no mere declaimer. He speaks with the authority of a man who has studied and mastered his subject, and who has fairly dissected the fallacies which he so ably exposes.

The Christian at Work.

Mr. Cook has taken his place as one of the ablest controversialists of the day. His logic is remorseless. He lays every thing under tribute, and drives every nail home.

Worcester Spy.

As a thinker he has notable clearness and strength. His style is full of life and vigor; and he has an admirable mastery of the power of expression; but these alone would not sufficiently explain the great success of his Monday Lectures. The true explanation is, that he selected live questions for discussion, after having studied them, and taken pains to understand them thoroughly. He can meet the most perfectly furnished materialistic speculators on their own ground; is familiar with all the outs and ins of their methods of reasoning; and is able to match their knowledge of the studies and discoveries in physical science, which they use in support of the positions they endeavor to maintain.

Hartford Courant.

The volumes containing his metaphysical speculations and scientific treatment of the problem of religion sell like novels. Mr. Cook is not only a master of the art of putting things, but he is a wit. It is wit none the less because it is used for a serious purpose.

Presbyterian Banner.

The folly of materialistic philosophers has only been exceeded by their arrogance; and it is truly refreshing to find their inflated bubbles so completely punctured and dissipated by the keen thrusts of Mr. Cook's unanswerable logic.

The Penn. Monthly (Philadelphia).

His addresses have been well called prose poems. Nothing could seem less poetical to the eye than his numbered paragraphs. They

look like a series of theses set up for the defiance of all comers. But ear and sense alike are captivated as we read, and we are forced to recognize a master of English prose.

Religious Herald (Richmond, Va.).

No man in America is just now attracting more attention than Joseph Cook, and his Titanic blows are telling on the materialistic scepticism of the day. . . . He is clear, axiomatic, and irresistible through all his arguments, and, while always courteous to opponents, is often keenly satirical.

The Theological Medium, Nashville, Tenn.

His learning is immense, his faculty of order eminent, his imagination very brilliant, and his logic strong and close.

New Orleans Times.

The Lectures are crowded with eloquent passages, telling satire, and keen, critical, and precise reasoning.

San Francisco Evening Bulletin.

The style is peculiarly vivid, presenting occasionally some of the characteristics of Carlyle. The book, in consequence of its scope and general attractiveness, is destined to become very popular.

San Francisco Bancroft's Messenger.

Possessed of a calm, critical and methodical mind, Mr. Cook has constructed, from the material at his disposal, about a dozen of the most interesting essays that have yet appeared on the relation of religion and science. On almost every page of the volume, eloquence leaves its mark.

San Francisco Evening Post.

Emotion, clearness, and sound sense are the weapons with which he produces conviction.

The Congregational Quarterly.

We can most heartily commend the work on Orthodoxy for its graphic power, for its bold and manly exhibitions of truth, for the carefulness in general of its distinctions, for the magnetic quality of its style, for its clear aim and direction; in short, for a portrayal of orthodoxy such as is reasonable and defensible.

The Bibliotheca Sacra.

There is no other work on biology, there is no other work on theology, with which this volume of lectures can well be compared. It is a book that no biologist, whether an originator or a mere middle-man in science, would ever have written. Traversing a very wide field, cutting right across the territories of rival specialists, it contains not one important scientific misstatement, either of fact or theory. Not only the propositions, but the dates, the references, the names, and the histories of scientific discoveries and speculations, are presented as they are found in the sources whence they are taken, or at least with only verbal and minor changes.

CRITICAL ESTIMATES (FOREIGN).

Rev. R. Payne Smith, Dean of Canterbury.

The lectures are remarkably eloquent, vigorous, and powerful, and no one could read them without great benefit. They deal with very important questions, and are a valuable contribution towards solving many of the difficulties which at this time trouble many minds.

Rev. Dr. Angus, the College, Regent's Park.

These Lectures discuss some of the most vital questions of theology, and examine the views or writings of Emerson, Theodore Parker, and others. They are creating a great sensation in Boston, where they have been delivered, and are wonderful specimens of shrewd, clear, and vigorous thinking. They are, moreover, largely illustrative, and have a fine vein of poetry running through them. The Lectures on the Trinity are capitallly written; and, though we are not prepared to accept all Mr. Cook's statements, the Lectures, as a whole, are admirable. A dozen such lectures have not been published for many a day.

Rev. Alexander Raleigh, D.D., of London.

The Lectures are in every way of a high order. They are profound and yet clear, extremely forcible in some of their parts, yet, I think, always fair, and as full of sympathy with what is properly and purely human as of reverence for what is undoubtedly divine.

Rev. John Ker, D.D., of Glasgow.

My conviction is, that they are specially fitted for the time, and likely above all to be useful to thoughtful minds engaged in seeking a footing amid the quicksands of doubt. There is a freshness, a power, and a felt sincerity, in the way in which they deal with the engrossing questions of our time, and, indeed, of all time, which should commend them to earnest spirits which feel that there must be a God and a soul, and some way of bringing them together, and which yet have got confused amid the negations of the dogmatic scepticism of our day. I had the pleasure of meeting Mr. Cook four years ago, when he was visiting Europe to make himself acquainted with different forms of thought, and I could see in him a power and resolution which foretold the mark he is now making on public opinion.

Rev. C. H. Spurgeon.

These are very wonderful Lectures. We bless God for raising up such a champion for his truth as Joseph Cook. Few could hunt down Theodore Parker, and all that race of misbelievers, as Mr. Cook has done. He has strong convictions, the courage of his convictions, and force to support his courage. In reasoning, the infidel party have here met their match. We know of no other man one-half so well qualified for the peculiar service of exploding the pre-

tensions of modern science as this great preacher in whom Boston is rejoicing. Some men shrink from this spiritual wild-boar hunting, but Mr. Cook is as happy in it as he is expert. May his arm be strengthened by the Lord of hosts!

London Quarterly Review.

For searching philosophical analysis, for keen and merciless logic, for dogmatic assertion of eternal truth in the august name of science such as thrills the soul to its foundations, for widely diversified and most apt illustrations drawn from a wide field of reading and observation, for true poetic feeling, for a pathos without any mixture of sentimentality, for candor, for moral elevation, and for noble loyalty to those great Christian verities which the author affirms and vindicates, these wonderful Lectures stand forth alone amidst the contemporary literature of the class to which they belong.

London Baptist Magazine.

Mr. Cook's "Monday Lectures" have already become one of the most popular and useful institutions of America; and on this side the Atlantic we know of no author, either British or American, who is just now so widely read.

Rev. A. Melville, Glasgow.

It is because Mr. Cook refuses no real help that "offers itself to him from any quarter, that he finds firm footing on the heights to which he climbs. His lectures present most valuable training for dealing with all such questions, from the fact that they take so wide a range, and combine so skilfully all departments of truth. — *Introduction to Glasgow edition of Boston Monday Lectures.*

The British Quarterly Review.

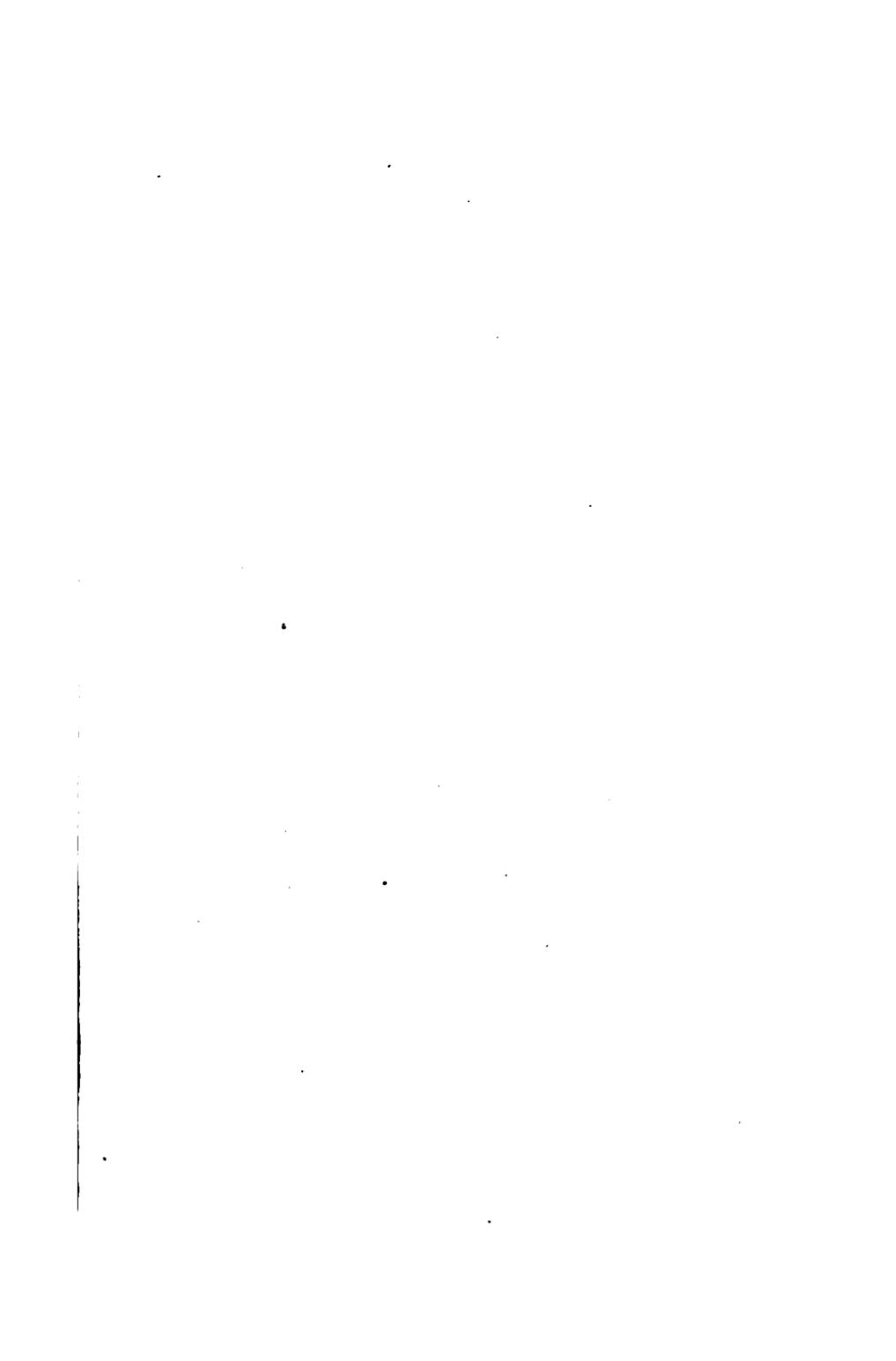
Mr. Cook is a man of wide reading, tenacious memory, acute discrimination, and great power of popular exposition. Nothing deters him. He plunges in *medias res*, however abstruse the speculation, and his vigor and fire carry all before them. He has intuitive genius for pricking wind-bags, and for reducing over-sanguine and exaggerated hypotheses to their exact value. He has called a halt in many an impetuous march of science, and exposed a fundamental fallacy in many a triumphant argument.

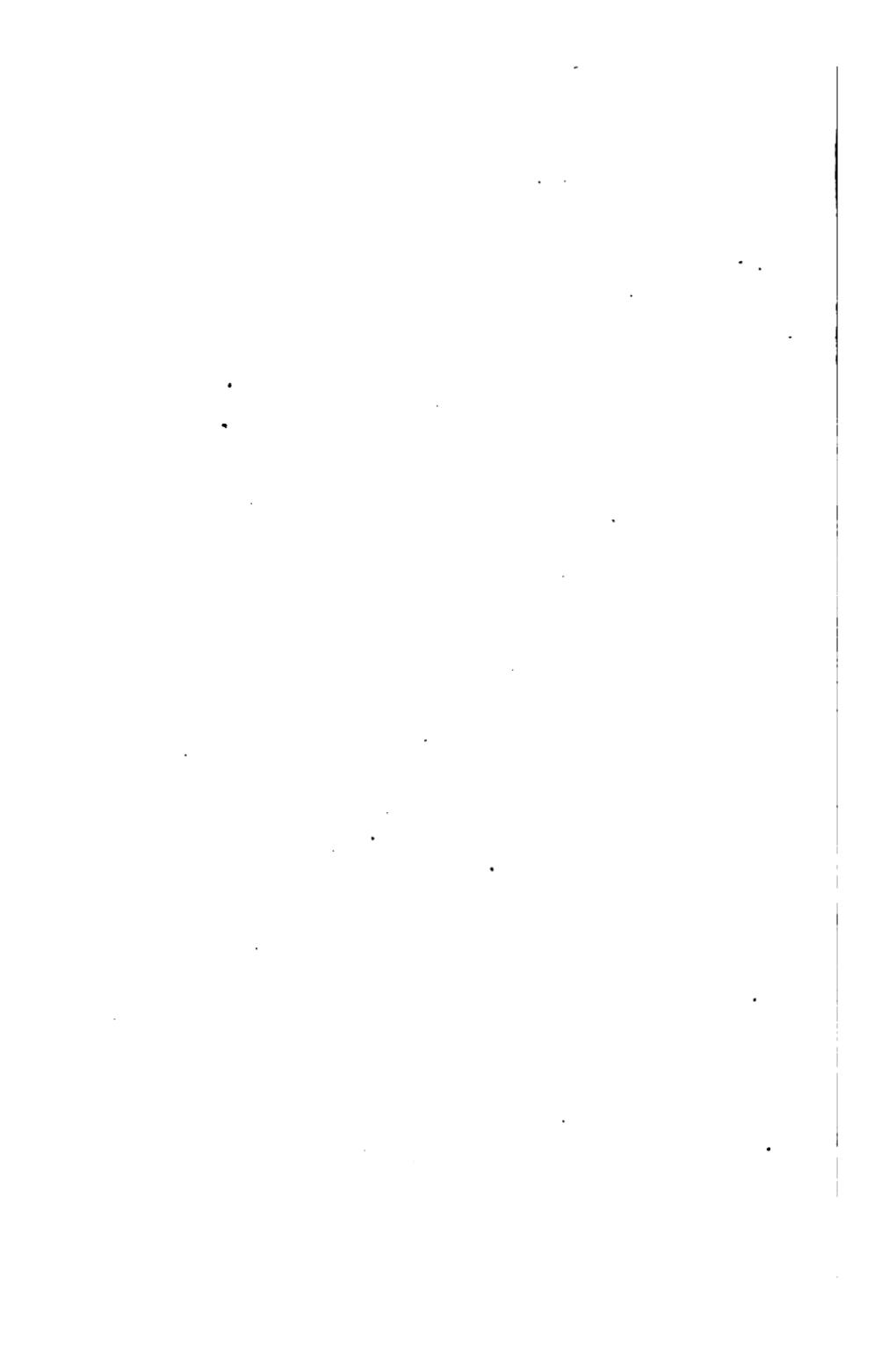
The London Spectator.

The incisiveness and raciness of their style make the lectures decidedly worthy of attention. The discussions of the permanence of moral character and the self-propagating power of sin are striking and forcible in no small degree. The lectures on the barrenness of ethics without a personal God, and on "Trinity and Tritheism," are full of true and elevating thoughts, and genuine and wholesome sentiment.

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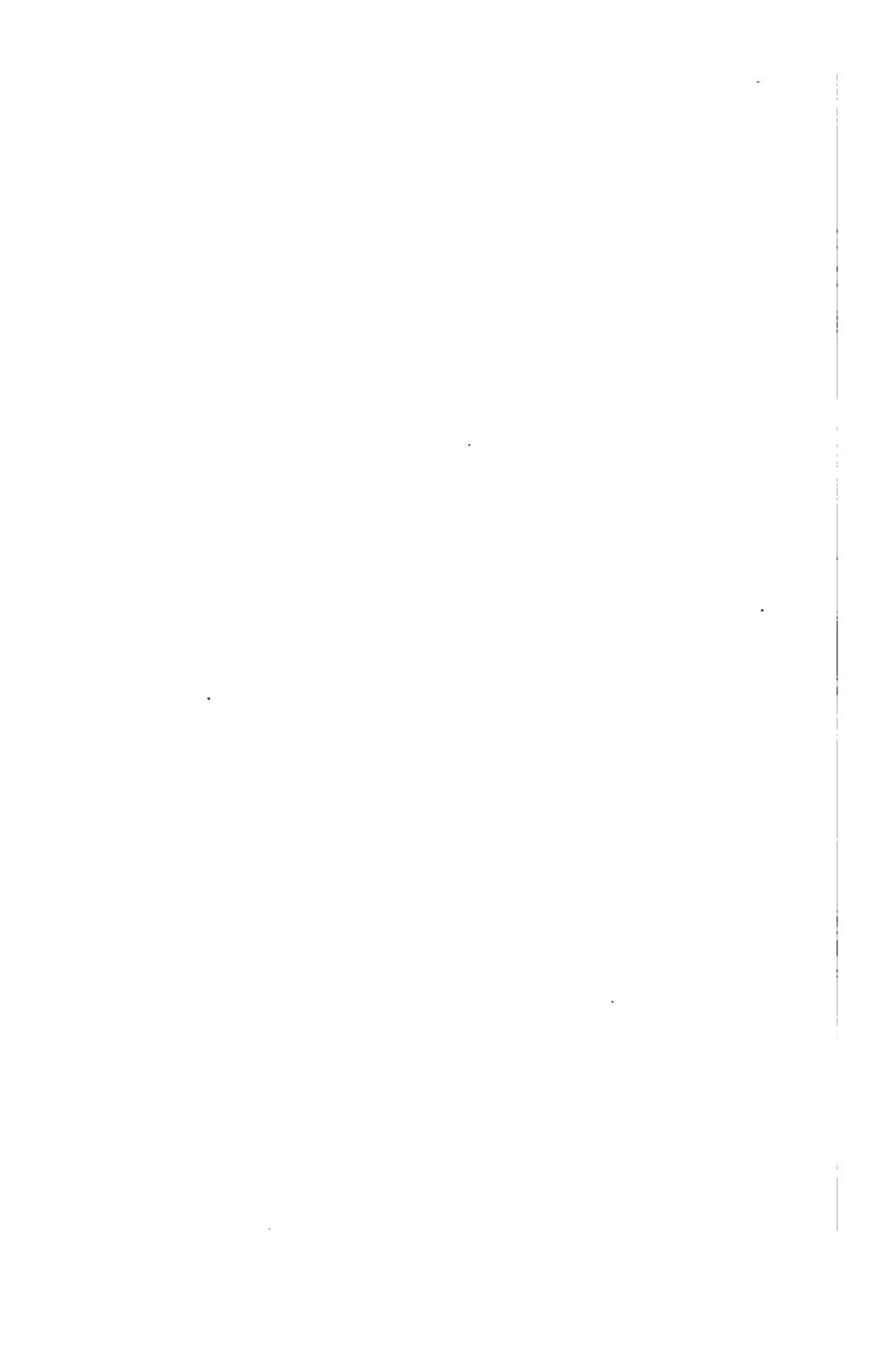
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